Fennovoima's year 2019

FENNOVOIMA

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CEO Review and Strategy

Reprogramming to enable progress and co-operation

The year 2019 was one of co-operation and progress. We started the year by launching our development program, with the target of reprogramming both ourselves and our plant supplier RAOS Project Oy. This had become necessary due to the severe project delays that we had faced during the previous years. We had already been carefully analyzing the situation in 2018, so our priorities were clear as we headed into 2019.

Our first priority was to resolve plant-level safety issues, ranging from bedrock and site uncertainties to major plant design and layout solutions. By year end, we could state that our Hanhikivi 1 plant design will support a very high level of nuclear safety and security, with well-defined open items to be closed during the engineering and licensing process. We also submitted the first batch of the preliminary safety analysis report (PSAR) to the Finnish Radiation and Nuclear Safety Authority (STUK). This marked the start of the technical construction license activities – great results of many experts working well together.

Our second priority was to start reviewing the plant systems and buildings design. A new technical co-operation plan was prepared together with the plant supplier, to agree on a multi-stage basic design process and related quality plans. At the first basic design stage, we review the design and associated PSAR documentation, and in later stages, we will review the final design documentation and implementation data. By year end, we had reviewed most of the systems design and started to review building layouts.

In early spring 2019, we also reorganized ourselves to enable clear ownerships for the different parts of the Hanhikivi 1 plant (assets), project deliveries by the plant supplier (scopes), and our own corporate functions (support). The related transformation still requires our attention to find the right balance between the long and the short term. This is important because we need to see ourselves both as a project company and a future nuclear licensee. Our new organization enables us to find the right ways forward.

Our third and fourth priorities last year were related to the preparations for the construction and operational phases of the plant lifecycle, respectively. For these and the above-mentioned safety and design priorities, we developed new approaches and acceptance criteria in meetings which we call Fennoforums. As a new company, we need to constantly develop and renew ourselves as our project goes ahead. This can be accomplished by a combination of innovative dialogue and careful decision making.

Our organization and our people form the foundation for succeeding in the Hanhikivi 1 project and operation. For the first time ever, we faced in 2019 the challenge of reviewing a large amount

of plant design documentation—and we were capable of accomplishing this. Sure, we used new approaches but the most important fundament for this success had been created over the years: competence and resources. It is indeed a great pleasure to express my gratitude to all the people that have been and are building Fennovoima, from the inside and from the outside.

As our train is now moving ahead, also the challenges we face will become broader. This is the subject of the strategy chapter of this report. We have now achieved a more proactive mode of leading the project and our operations. In practice, this means that we do not only react to problems, but we can see the big picture and prepare ourselves for the next stages. I expect this to gradually become clearer to all of us and all our stakeholders, including everyone involved in the important local activities in the Pyhäjoki region. I hope you will enjoy the stories and statistics of this report. They tell about the responsible work we are doing. Thank you for being interested in our journey!

Timo Okkonen
COO & Interim CEO

Strategy and program

Fennovoima is focused on building and operating the Hanhikivi 1 nuclear power plant. This mission requires a strategy and program on how to accomplish this. This chapter gives a brief outline of all the related elements, as divided into four main dimensions:

1. **Plant design, construction, and operation**
2. **Project management, suppliers, and deliveries**
3. **People, leadership, tools, facilities, and support**
4. **Performance, risk factors, licensing, and financing**

Our plant forms our main focus. It is required to enable a very high level of safety in accordance with Finnish regulatory requirements and guidelines of STUK. In addition, our contract with the plant supplier requires the plant design and operational features to enable a high level of full power availability and a long plant lifetime.

We co-operate with the supplier to make the necessary design adjustments, and we control that the Hanhikivi 1 plant will fulfill the requirements. For making sure that our decision making is based on a top-down view, we apply integrated views and target-oriented criteria on plant safety, construction readiness, implementation quality, and operational readiness. These criteria are graded by the importance of the subject.

Our project is huge. Our success depends on the capability of the plant supplier and all their partners and subcontractors to deliver on time and with the required quality. The main delivery scopes may be divided into engineering and licensing, procurement and supply chain, construction and installation, and commissioning and training. In the operational phase, we also need the nuclear fuel supply and other supporting services.

The supplier's capability to deliver requires constant and proactive attention from our side. We are interested in the delivery plans and contracts, work schedules and processes, products and services, as well as meeting the Finnish requirements and conditions.

Our people make things happen. Our success depends on each organizational unit having the necessary competence and resources, which depend on the specific phase of the project and the plant life cycle. We need to have clear roles and responsibilities at all organizational levels. Our management system and all our tools need to be set up to support every one of us in our work. As the project goes forward, digitization will be the key to scaling up and remaining efficient in the daily flow of information and decisions.

All our processes and communications need to be aligned to ensure the right competence and resources, to apply the contract and requirements in a systematic way, to co-operate proactively with the suppliers, to control the deliveries for

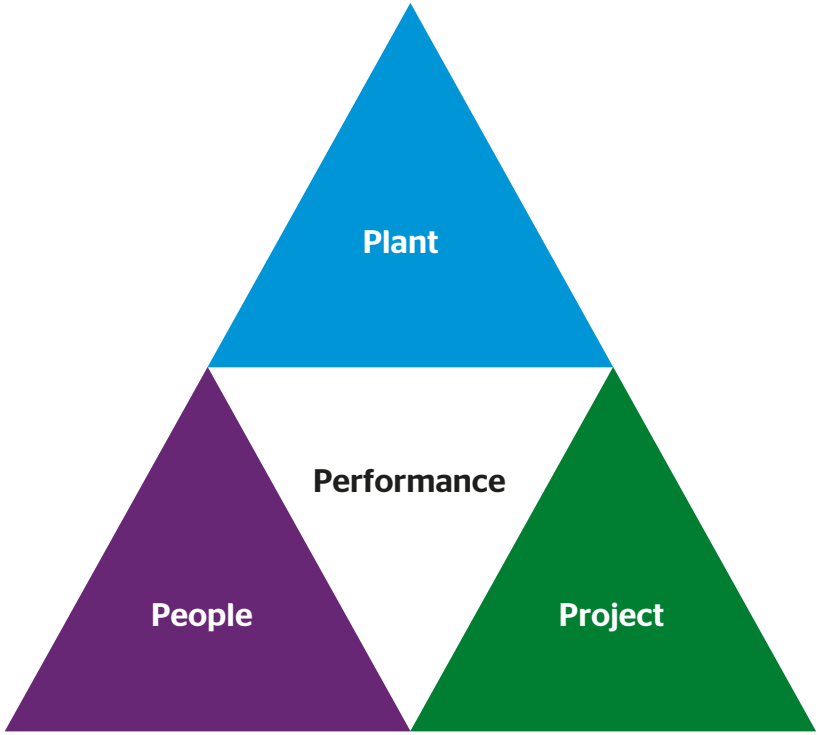
determining their acceptability, and to build a learning and developing culture. These are the core processes for executing our business up to the operational phase.

Our performance is measured in all of the aforementioned dimensions: plant performance, project progress, and people effectiveness. For the main goal of operating the Hanhikivi plant, we will be assessed on the safe plant operation, responsible company operations, and shareholder value by the planned electricity price. We also need to pay attention to the "dark side of the moon", i.e., the risks involved. Also, the necessary regional and stakeholder activities are part of our risk management scope.

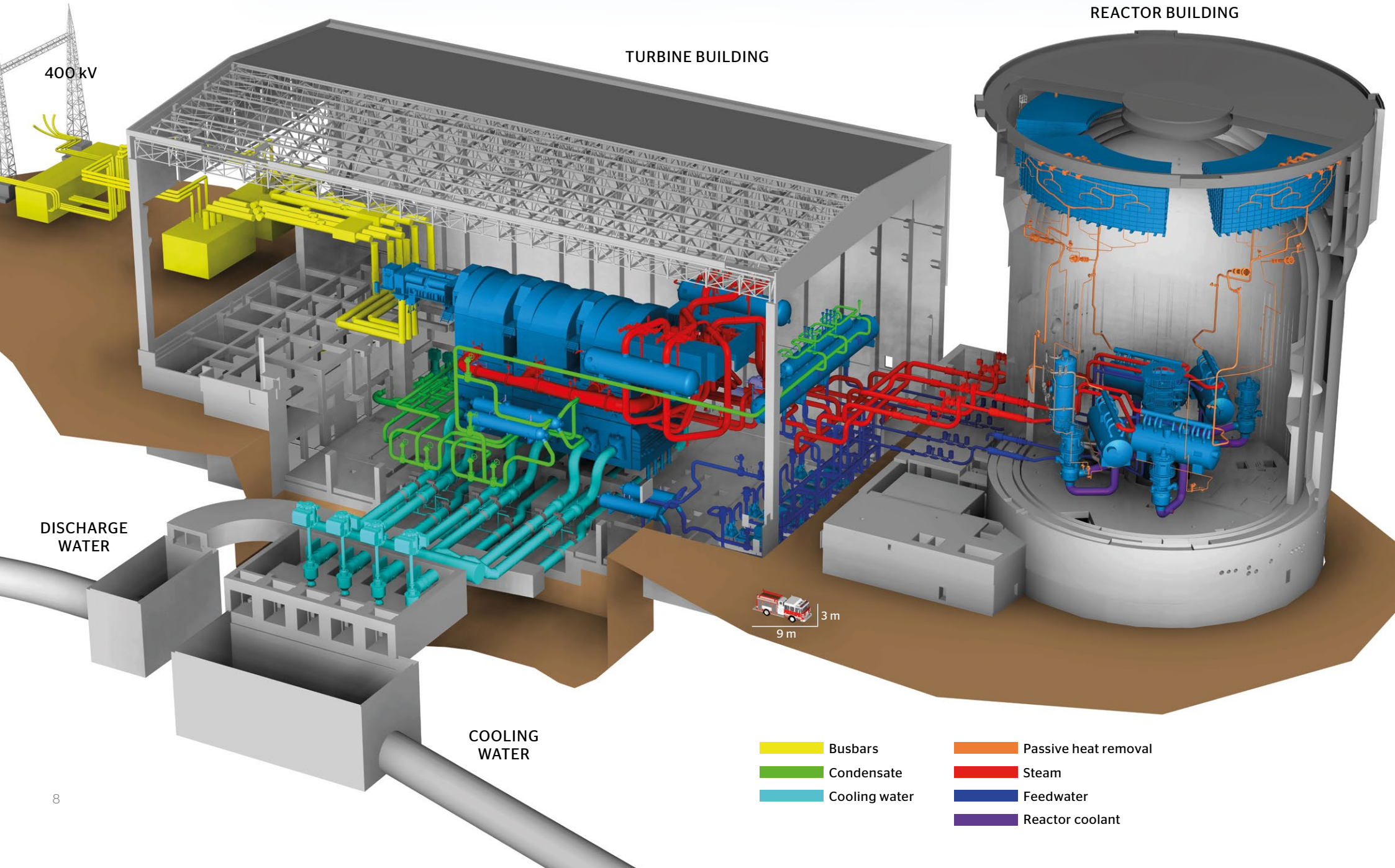
Licensing and financing efforts form the most important acid tests for our safety demonstration and risk management level. We want our board and shareholders to be well informed about our current performance and the possible risks in front of us.

Our strategy requires us to excel in both leadership and management in the different phases of the Hanhikivi 1 plant life cycle and our own organization. We are running operations that carry a high societal, economic, and ecological value. This makes us motivated and committed to work with our full heart. We are part of the sustainable energy solution and we are required to demonstrate our responsibility. This requires us to report and communicate well, both inside and outside.

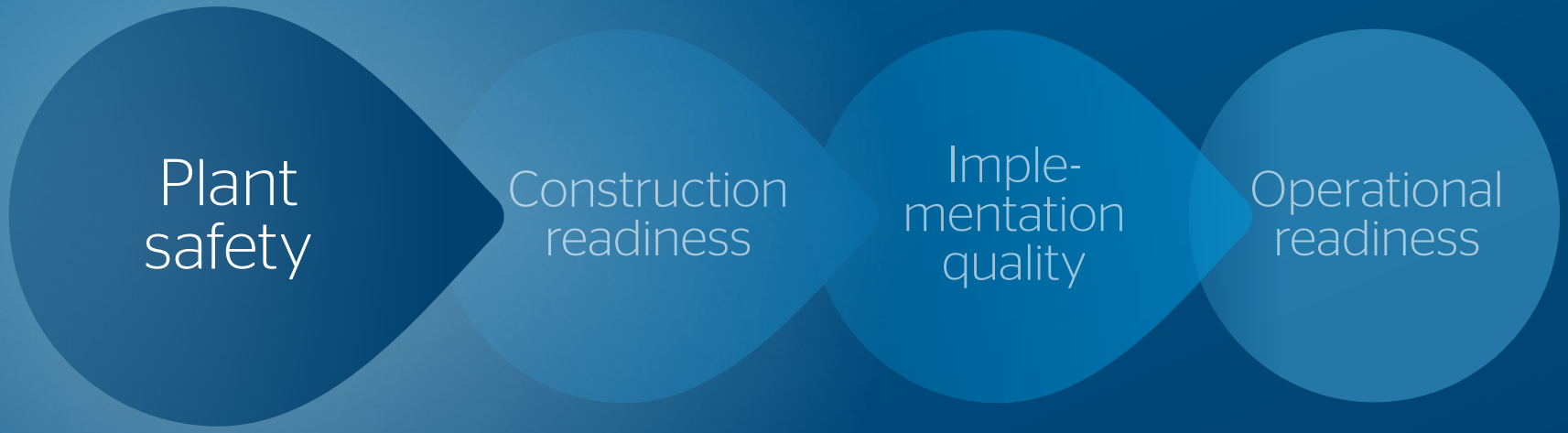
We will not succeed with a strategy that only applies to Fennovoima. Our full program involves our plant supplier and their subcontracts, nuclear and other regulatory authorities, our shareholders and our people, municipalities and local services, and basically society as a whole. This is the reason why our strategy and plans need to be felt like the strategy that fits everyone involved in our endeavor. When we say "we", we mean all of us building up Fennovoima's operations and the Hanhikivi 1 plant!



3D model of the Hanhikivi 1 nuclear power plant



Aerial picture of the Hanhikivi 1 project area in fall 2019.



Plant safety

Nuclear safety lays the basis for our operations. The safety of the plant is ensured during the design phase.

Ensuring plant safety

Janne Liuko
Nuclear Safety Director

We are currently proceeding at a fast pace with the design of the plant and its safety assessment. We have reviewed all of the key safety systems and identified some open technical issues that we are currently resolving.

We have adopted a comprehensive, solution-based safety assessment approach. We have determined our target level and criteria for plant safety. First, we assess, based on our own expertise, whether the plant meets our expectations. Then we verify compliance with the statutory requirements. With our own proactive assessment, we want to ensure that we can influence the design of the plant if necessary, so that we will receive a plant that complies with our wishes.

Completion of the fractured bedrock zone evaluation last year was an important milestone for us. We also focused on assessing the reactor primary circuit and plant hazard protection, and achieved a great deal more clarity in these respects. On the other hand, we also detected some challenges. Particularly in the design of the control building, there is still plenty of work to do for the design to be appropriately robust and meet our requirements especially in terms of fire and earthquake safety. We have come to the conclusion that we cannot proceed further with the control building before significant modifications are made.

This year, critical matters in terms of safety include the resolution of open issues pertaining to the primary circuit and the containment, as well as completing their design. The open issues will not necessarily cause any modifications of the plant design, but we must continue with the discussions about these matters with the plant supplier and the main designer and perform more studies in order to verify that the solutions are appropriate. Furthermore, safety system assessments and safety and hazard analyses must be completed to the extent that we can finalize our own safety assessment and submit the related documentation to the Radiation and Nuclear Safety Authority. There are approximately thirty key safety systems. We did not detect any major modification needs during thorough assessments of these systems.

We have also proceeded with the preliminary safety analysis report (PSAR) that is a requirement for plant licensing. A PSAR localization project that was launched by the plant supplier a little over a year ago carries the responsibility for the completion of the licensing documentation. We were able to submit the first of a total of fifteen documentation batches to the Radion and Nuclear Safety Authority for assessment. We already have some documentation for the next batches ready, but some technical issues also remain to be resolved.

In accordance with our new approach, we aim together with the plant supplier and the main designer to proactively identify any problems that we may face later on. We have plenty of work to do, but the big picture is clear and we know what must be done. This is the way forward.

FRACTURED ZONE AND PLANT LOCATION

There are certain significant fractured zones in the bedrock at the Hanhikivi nuclear power plant site. Possible slow movements of the bedrock due to land uplift after the last ice age and movements caused by seismic events in the fracture zones have been comprehensively studied. The studies and investigations include previous studies, of which the first ones were conducted already in 2018, and studies on eight new topics. The studies include for example bedrock investigations in the plant area and assessments of observed land movements in Olkiluoto and in some Swedish nuclear power plants.

The conclusions state that the movements, if any at all, are insignificant in terms of nuclear safety and constructability. On the basis of all of the studies and investigations, Fennovoima considers the current plant location acceptable.

However, we will monitor movements of the bedrock throughout the plant lifecycle. In addition, properties of the bedrock will be taken into account in the design of the buildings. We will continue discussions on this subject matter with the plant supplier in early 2020.

Thoughts on safety system reviews

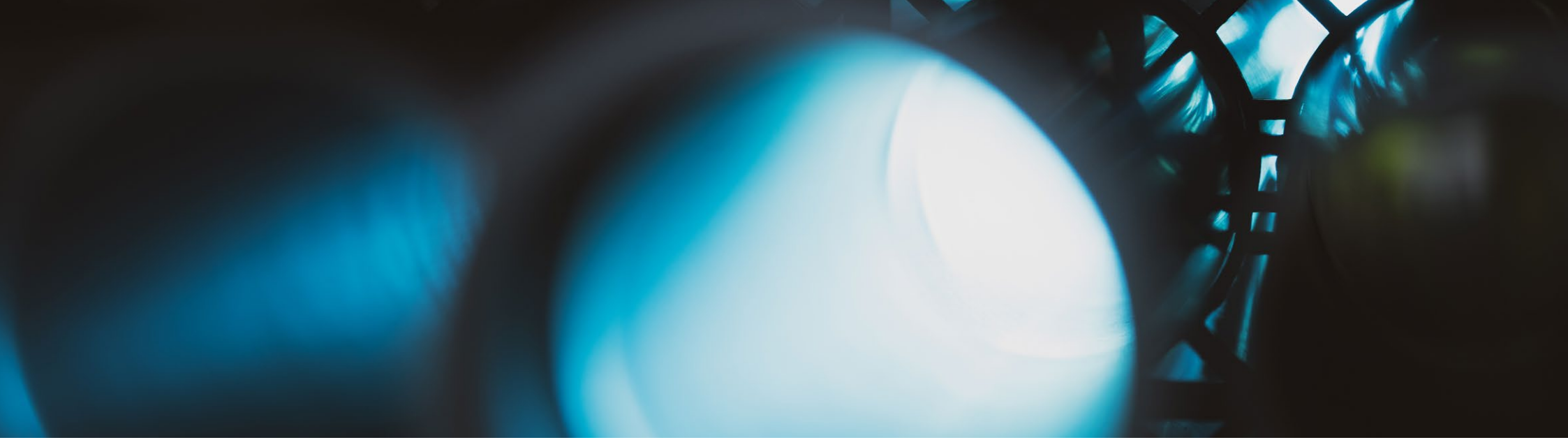
Reviews of the plant's safety systems in accordance with the new stagewise review strategy started in April of last year and I started to receive basic design documentation included in my area of responsibility. The documentation included the boron injection system and the emergency core cooling systems, for example.

When assessing safety systems, we pay attention to, for instance, appropriateness of the safety classification and availability and maintainability of the system. We follow a standardized set of evaluation criteria to ensure that the reviews are comprehensive and consistent. We never accept any documents that contains flaws or issues that have an impact on safety. However, at this first stage of the review process, we can tolerate if some information that has no implication on safety is still missing from the documents or typos, because we can return to those during the latter review stages. Naturally, all of the information must ultimately be accurate and appropriately presented.

Over the course of last year, I received for review documentation on ten of the total of twelve safety systems included in my area of responsibility. All aspects influencing safety were in order in the documentation, and we gave our conditional acceptance for seven of the documents. I believe that we will also accept the remaining three documents very soon.

Sergey Kuzin
System Engineer
Safety systems

Reviewing the documentation was not easy at first, because we were simultaneously practicing the new review process and evaluation criteria. Nevertheless, we succeeded in the work, thanks to close cooperation with the other departments. The practical work also provided us with information that helped in finalizing the review guidelines and procedures.



PRINCIPAL EVALUATIONS

In early 2019, we established focus groups consisting of experts from different engineering disciplines to scrutinize concerns, challenges, and open issues related to plant-level design and the overall licensability of the plant. A summary of the key results of these evaluations is given below.

Layout evaluation for plant-level buildings

The evaluation focused especially on safety design features that could have a significant impact on layout and structural design of the plant. These include for example matters influencing the exterior dimensions of the power plant buildings, such as structural fire protection arrangements, radiation safety of access routes and facilities, and physical protection.

The assessment revealed deficiencies, for instance, in the realization of some system separation principles. In particular, the principles were not realized, or the realization of the principles was not clearly indicated by the design documents in the case of the control building. The evaluation also emphasized a need to comprehensively investigate the buildings and facilities where the separation principles cannot be realized by means of simple structural separation.

The description of functional design in the design documents was not sufficiently detailed at this point to allow for a proper assessment of the support functions. This applied to the cooling and ventilation functions, in particular.

In addition to submitting the assessment results to the plant supplier and the general designer, we gave some concrete modification proposals and submitted some requests for clarification, some of which have already been taken into account in the plant design. We established a separate focus group that focuses on assessing the design of the control building. The plant level building evaluation was also an efficient means of clarifying Fennovoima's internal basic design evaluation processes and criteria.

Reactor and primary circuit

The purpose of the evaluation was to create a fundamental understanding of the reactor and primary circuit as safety barriers. The evaluation was divided into two parts: the fuel and reactor core and the primary circuit were evaluated separately.

According to the assessment results, critical open design issues involve, for instance, operating experience on fuel, in-core measurement, and the plant's availability factor. A need to supplement or update some of the analyses and documents was also observed.

Radiation safety

With the evaluation, we aim to ensure that we have a clear understanding of all the matters influencing radiation safety in the plant. In addition, we identify any open issues related to plant design that should be changed or at least justified in more detail in the design. The work started in 2019 and will continue in 2020 with discussions with the plant supplier, followed by a presentation of the results to STUK.

Progress made in the key development areas identified in STUK's preliminary safety assessment

For more information, see STUK's preliminary safety assessment (2014).

MAJOR TOPICS	PROGRESS IN 2019	
1. The design of nuclear power plant shall take the crash of a large commercial airliner into consideration as an external hazard.	During 2019, a diverse air-cooling residual heat removal system for reaching safe state after a large comercial airplane crash was included in the design. Also, required changes for the control building have been defined. Verification activities to demonstrate fulfilment of requirements related to a large airplane crash will continue in 2020.	
2. System design shall apply the separation principle to ensure the implementation of the safety functions even in the event of a failure and during internal and external hazards.	During 2019 systems applying the separation principle and separation of the safety functions have been clarified. In addition, the modifications required to fulfil the separation principle in the control building have been identified. The work will continue with system and building evaluations and verification activities in 2020.	
3. Depressurization of the primary circuit in a severe accident.	The objective is to prevent the reactor core from melting through the bottom of the pressure vessel under high pressure conditions during a severe accident. The design provides a separate emergency pressure reduction system that is dedicated for managing severe accident conditions. The operation and capacity of the system will be justified in severe accident analysis.	
4. Experimental substantiation of passive heat removal systems (PHRS).	The plant supplier has delivered new revision of the experimental and calculational justification for the functionality of the passive heat removal systems of the containment building in December 2019 and a new revision of justification for the steam generator was expected in early 2020. Further experiments to demonstrate the functionality of the passive heat removal systems have been carried out in the test facility at Lappeenranta University of Technology. The report of the test results will be completed early 2020.	
5. Detailed demonstration of compliance with the Finnish requirements in terms of the redundancy, separation, and diversity principles of the systems that ensure safety functions.	The documentation is prepared as part of the functional safety design process. During 2019 the scope of the process was extened to cover normal operation design. The final demonstration of compliance can be found in licencing documentation and system requirements assessment.	
6. The effect that the material of the reactor pressure vessel has on the radiation embrittlement rate.	STUK has approved the supplier's justification of the reactor service life of 60 years with requirement to perform additional irradiation test program for reactor material and its welded joints. Also, irradiation test program (plan) is approved by STUK with minor requirements related to specimen sampling phase. Planning for the program execution is ongoing. A surveillance program for reactor materials will be conducted during operation.	
7. The effects that postulated, sudden pipe breaks of the primary coolant circuit have on the durability of the internal parts of the reactor as well as the implementation, inspection and radiation protection principles of the primary coolant circuit nozzles.	An analysis will be carried out in accordance with the YVL requirements. The corresponding analyzes of the reference plant have been submitted to STUK with positive results and the Hanhikivi 1 design spesific analyzes will be submitted to STUK in batch 2 of the pressure vessel structural design.	

MAJOR TOPICS	PROGRESS IN 2019
8. Design of penetrations in upper part of containment building and tendon system of inner containment.	For the penetrations in the top section of the containment, the main risk relates to how difficult they are to build. The constructability has been demonstrated in the second implementation phase of the Leningrad plant. The leak-tightness of the penetrations is demonstrated in preliminary safety analysis as a structural requirement and the fulfilment of the requirement is verified later with structural design.
9. The suction strainers of the safety injection systems and experimental verification of their functionality.	Discussion about the insulation materials of the containment building are on-going. The functionality of the cooling water filters will be verified before construction with experimental tests that assess the functionality of the cooling systems during accidents.
10. The technical solutions that are related to obtaining the cooling water for the systems that implement the diversity principle in residual heat removal for a 72-hour period.	The plant supplier's justification for the adequacy of water inventory shows that residual heat removal can be continued without external supplies for a week.
11. Independence of the systems used to implement the severe accident management strategy (SAM).	The severe accident management strategy has been developed during 2018-2019 to meet the Finnish requirements. The strategy will be presented to STUK as part of the preliminary safety assessment report (PSAR).
12. A procedure and systems to reduce containment pressure to achieve a long-term safe state after a severe accident.	The systems and procedures to achieve a safe state after a severe accident will be descripted in the severe accident management strategy as part of the PSAR.
13. Realization of safety principles and objectives in the technical solutions of the plant with regard to I&C systems.	At the end of the year, the plant supplier announced that it had chosen Framatome-Siemens to supply I&C systems. Preparations for automation architecture design are currently on-going.
14. Separation principles for electrical systems.	The general principles for the separation of electrical systems are described in chapters 1.3 and 3.0 of the PSAR. The chapter 8 will describe the electrical systems more in detail but it is not yet fully finalized.
15. Scope of the hardwired diverse I&C system.	The scope of the hardwired diverse I&C system will be described in I&C architecture and in the chapter 7 of the PSAR that describes the automation systems.
16. Application of the diversity principle in the measurements of the reactor protection system and in activation of the protection.	Measurement sharing principles are currently presented in a document called Plant Safety Design and will be refined in functional architectures. As a result, automation design will provide sufficient basis for the design of automation systems.
17. Cooling of auxiliary and support systems and substantiation of a sufficient cooling water supply.	The design includes a cooling system for the safety systems ensuring its functionality in both normal operating conditions and in design basis accident conditions.

The color codes represent Fennovoima's view of the situation. = The matter has been resolved. = There is a solution for the matter and it is known in which document and when the solution is presented. = The matter is not resolved yet.

= Situation at the end of 2018 -> Situation at the end of 2019.

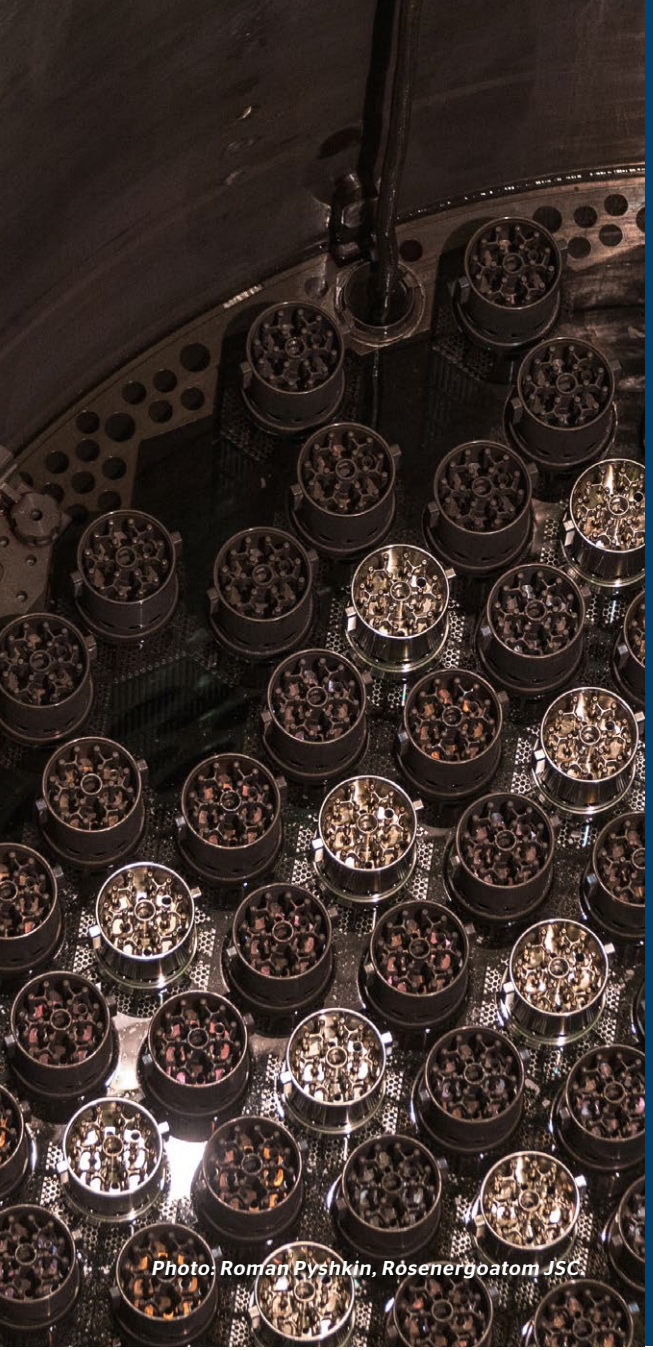


Photo: Roman Pyshkin, Rosenergoatom JSC

Our selected fuel is reprocessed uranium

We have opted to use reprocessed uranium (RepU) as the fuel in Hanhikivi 1. The RepU for the plant will be manufactured in Russia either by a MSZ plant in Elektrostal or the Novosibirsk Chemical Concentrates Plant (NCCP). In both plants, the manufacturing process covers all stages from the manufacture of fuel pellets to ready-made assemblies. At present, the only spent nuclear fuel reprocessing plant is RT-1 in Ozyorsk, Russia, but to our knowledge, a new reprocessing plant, RT-2, should be completed in 2025 in Zheleznogorsk, Russia. The fuel supply chain is regularly audited.

Manufacture of the fuel for the initial core load will start a couple of years before the completion of the plant. RepU is manufactured by separating unspent uranium from spent nuclear fuel by means of a chemical process. The process allows utilization of uranium that would otherwise go to waste. RepU is often confused with mixed oxide fuel (MOX) that contains plutonium. However, RepU only contains different uranium isotopes and no plutonium at all. RepU has been or is currently used in Europe in Switzerland, France, Germany, and Sweden, for example.

There will be a separate licensing process for the fuel once we have obtained a construction license for the plant. For the licensing process, we will submit a fuel suitability study to the Radiation and Nuclear Safety Authority. The suitability study will include a preliminary final disposal feasibility study of the fuel on which Posiva Solutions has been working since 2019. With these studies, we will demonstrate that the fuel meets all of the Finnish requirements for nuclear fuel and reactor core design.

Jussi Kumpula
Reactor Physicist

We have reviewed and approved various reports submitted by the fuel supplier and compared their results with our own reactor physics calculations. Hence, we are already familiar with the properties of the fuel. In terms of mechanical design, the fuel is exactly the same as in the other VVER-1200 plants. The materials and mass of the fuel will be highly similar to the fuel of OL3, for example.

Construction readiness

Readiness to begin construction must be achieved well before the nuclear power plant construction licence is granted to us, so that the plant construction work can commence promptly. Progress in technical design and supply chain readiness are key prerequisites for starting construction. The site preparations are well advanced and our practices in the project area are functional. We are preparing to the commencement of the plant construction together with the local stakeholders.

Plant basic design is progressing

A nuclear power plant is a large and complex entity consisting of a variety of systems and structures from different branches of technology. Hence, the plant design process is also complex and multi-dimensional, consisting of a large number of interfaces and parallel stages. Furthermore, licensing introduces a whole new dimension to the whole.

Over the past year, we have been able to manage the design and the processing of open issues in a manner that allows us to efficiently proceed with the design. These successes were achieved after many difficulties and required a change in both our organization and in the approach of the whole project.

In my opinion, a decisive factor in terms of the progress of the design was the fact that the review of basic design was divided into two stages. The division allows us to focus on technical issues when reviewing the design documents during the first stage, as we can address the formalities of the documents at the next review stage. In addition, Fennovoima's new organizational structure has clarified internal responsibilities and interfaces.

In my opinion, the submitted basic design documentations looks good in terms of design: safety-related matters have been appropriately considered, and no major changes are to be expected. Solutions for most of the open issues have also been found. This has provided us with more assurance on the appropriateness of the design solutions, which has allowed us to proceed further with the design. There is still plenty of work to do, however.

I feel that the Fennovoima employees have adapted to the new organization quickly, and they have adopted their new roles and responsibilities – as well as assumed more ownership to take a stand on the design solutions. We have seen commendable commitment in the work, as well as flexibility when it is required. The plant supplier and main designer have also made significant progress in their development of the management of the design processes and design. They have demonstrated a genuine willingness to ensure that the processes comply with the requirements. Overcoming the challenges has created more trust, and I believe that we have found a shared approach with the plant supplier.

Once the first review stage is complete, the documents will already clearly determine what the physical plant will look like. We do not expect to see any major modifications of the plant after that stage, and we can proceed to finalizing the documentation. Before we can reach the readiness to start construction on site and at the component suppliers' locations, we must also complete the detailed design based on the basic design and verify that the construction-related organizations and supply chains – including Fennovoima itself – are capable of implementing the plans and supervising the implementation according to those plans.

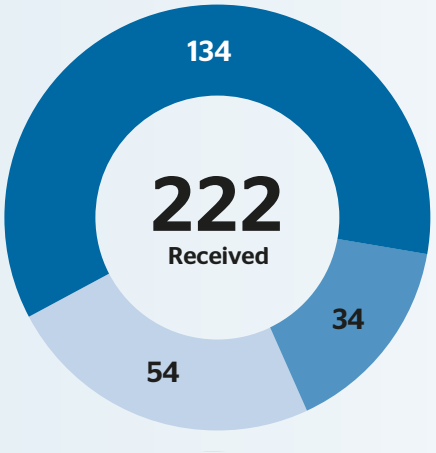
Petri Jyrälä
Engineering Director

Status of the basic design review

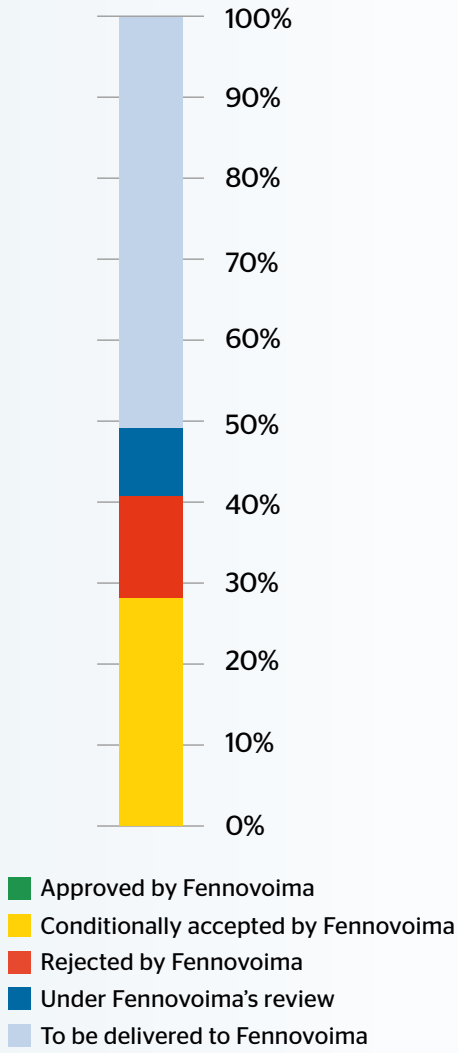
The plant supplier submits the design documentation to Fennovoima for approval. Our review for the documentation takes place in two stages. In the first phase, we evaluate the safety of the plant, availability and maintenance aspects. At the first review stage, we only issue conditional approvals for the documentation. By conditional approval we mean that there are no technical obstacles in the design documentation that would prevent its final approval at a later stage.

All approved design documentation is available to STUK but does not require STUK's approval. The preliminary safety assessment, which is a condition for the construction license, is a separate documentation package, and will be submitted to STUK for approval.

At the end of 2019, we were still waiting for the delivery of the basic design packages of the turbine island and buildings, of which the basic design documents for buildings are – except for the control room building – almost complete.



Number of the documentation that Fennovoima has received from the plant supplier and status of its review by January 15th, 2020.



Status of the first stage review of the basic design on January 15, 2020. The situation is constantly changing.

A glance at the hot topics in structural engineering

We at the structural division of the civil engineering department ensure that the integrity requirements for nuclear safety classified buildings of the power plant are met and the structural solutions are such that the plant is protected from internal and external hazards in all situations.

In my opinion, from the perspective of structural engineering, the most intriguing topics of discussion at the moment are related to the movements of the bedrock and to the control building. The former is based around an impact assessment on uneven movements of the bedrock on the power plant's foundations. The second one concerns an interesting feasibility study that examines the control building in terms of structural integrity and vibrations induced by aircraft impact and earthquake events. I am more involved with this latter one. The purpose of the feasibility study is to verify that the vibration calculations are correct so that the equipment installed later in the building, can be qualified for expected vibrations, and to verify if some particular structures need re-enforcement.

Both of the studies are very fascinating for a structural engineer like myself. The topics of the studies are relatively new areas of research and therefore only limited data is available on existing nuclear power plants. Due to comparative information being limited, realistic and conservative engineering judgement plays a major role in the final decisions.

Francisco Canales Mateo
Structural Engineer, Civil Engineering

Project site's readiness for construction

CONSTRUCTION WORK CARRIED OUT ON SITE

Preparatory construction work continued at the plant site in Pyhäjoki. At the end of the year, an average of 230 people were working on site.

During 2019, the plant supplier commissioned both the accommodation village and the plant supplier's and the main contractor's site offices; work on staff facilities and the site canteen continued. In the plant supplier's support functions area, construction work of the reinforcement workshop and the surface treatment building began in 2019. Groundwork for the plant supplier's storage area was started in the area located behind the accommodation village.

In the sea areas, the plant supplier continued with the water construction work and dredging of the nuclear power plant's cooling water discharge channel and the cooling water intake structures. Construction of the breakwaters and a cofferdam for the cooling water discharge channel continued.

Over the course of the year, Fennovoima started the construction of a grounding network that will cover the entire construction site. In addition, soil investigations were carried out in the turbine island area.

Preparatory construction work of the infrastructure in the project area on the Hanhikivi headland has reached a point where we are ready for the construction of the nuclear power plant as soon as the construction license is granted. However, before beginning the construction of the plant, some 700,000 cubic meters of rock must still be extracted from the excavation pit and the levelling concrete for the plant foundation must be poured. I also think, that the status of infrastructure and the capacity of the supporting buildings is good, especially after we start the construction of Fennovoima's administration building during this spring.

In addition to the physical readiness, the operating methods and systems of all the parties must comply with our requirements and the statutory requirements. The plant supplier and in particular the main contractor still need to develop their operating methods to make them suitable for the Finnish operating environment. Above all, actions are still required in terms of the procedures related to construction management and supervision, as well as the safety culture. Development of Fennovoima's construction supervision organization must also be continued according to plan.

The management of occupational health and safety and environmental impact in the project area is a good example of how results can be achieved. All the key parties at the construction site have good readiness in these respects, and the cooperation between the parties works efficiently. Our goal is to achieve the same level of readiness in all other activities as well.

Jouni Sipiläinen
Construction Director

In June, Fennovoima signed a contract on the construction of the administration building and plant office with Lehto Group. The actual construction is estimated to start in 2020.

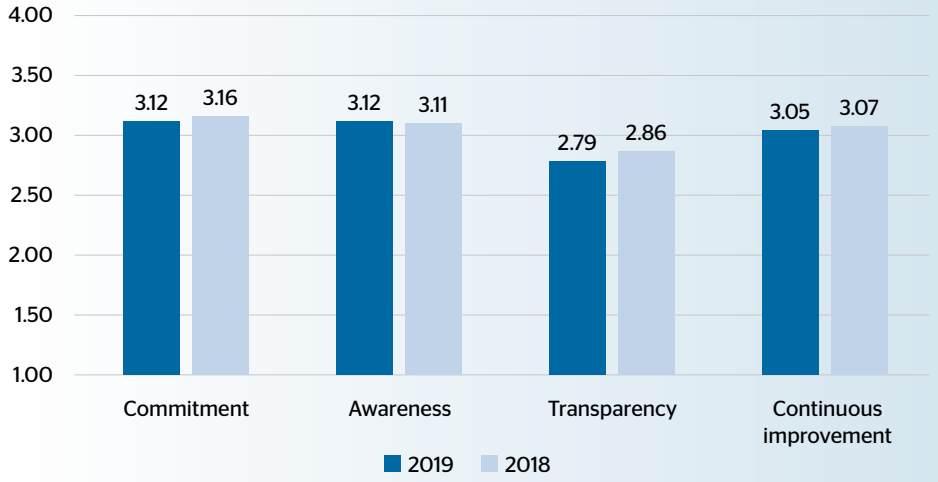
REALIZATION OF SAFETY CULTURE PRINCIPLES IN THE PROJECT AREA

We continuously monitor the safety culture status at the project area in the Hanhikivi headland by means of various methods, such as audits, the collection and analysis of observations, and by doing safety rounds in the project area. Furthermore, the safety culture status was studied with a survey in the fall. A total of 135 people working in different positions and for different companies in the project area replied to the annual survey (the response rate was approximately 75%).

The survey results were very similar to the results of the previous year's survey. The respondents were of the opinion that with the exception of transparency, the safety culture principles were implemented reasonably well in the project area. According to the survey results and observations made in the project area over the course of the year, cooperation between the companies operating in the project area should be further improved. Furthermore, transparency of decision-making and the operating methods must be increased.

Cooperation between the key parties active in the project area to develop the safety culture clearly increased last year. Now, Fennovoima, RAOS Project, and Titan-2 all have an expert who works full time on the development of the project area safety culture. This has enabled more effective processing of safety culture matters.

In 2020, we will focus on actions to increase transparency between the companies operating in the project area. The next safety culture assessment will be carried out in fall 2020 or in early 2021.



Realization of safety culture principles in the Hanhikivi 1 project area in 2018–2019. The Likert scale of 1–4 was used in the assessment, where 1 = completely disagree and 4 = completely agree. A score between 3.00 and 3.30 amounts to "fairly good, some development required" and a score between 2.70 and 2.99 amounts to "fairly poor, must be developed".

OCCUPATIONAL HEALTH AND SAFETY

In 2019, the Fennovoima occupational safety management system adopted the new ISO 45001 standard, and certification audit was conducted at the end of the year. The certificate was granted to Fennovoima in January 2020. The management system covers Fennovoima's own operations in Salmisaari and Pyhäjoki as well as the Fennovoima project area on Hanhikivi headland. The occupational safety management systems that RAOS Project and Titan-2 apply at the Hanhikivi 1 construction site meet the requirements of the OHSAS 18001 standard and will be updated to ISO 45001 standard at a later stage.

Occupational safety management and monitoring responsibilities are distributed among the different levels of Fennovoima's organization, from employees to the management team. The management team monitors how well occupational safety is realized on a monthly basis and carries out on-site occupational safety inspections at the Hanhikivi 1 project site twice a year. Fennovoima employees receive occupational safety training as part of the induction training that they receive at the beginning of their employment.

We manage and monitor safety at the project site together with the plant supplier and worksite supervisors. Daily occupational safety practices at the site are well established.

Effective risk management prevents accidents

Extensive risk identification and management procedures and reporting of safety observations are an important part of preventive occupational safety measures. We assess occupational safety risks from the perspectives of risks to the employees, facilities and the Hanhikivi 1 project site four times a year. Also, we encourage our personnel to make and report observations to improve our occupational safety culture.

At the project site, all contractors working within Fennovoima's scope of work follow the extensive risk assessment and management procedure that is based on Fennovoima's risk register. This ensures that risk assessments are carried out in a consistent manner and meet our requirements. The plant supplier, RAOS Project, and the main contractor, Titan-2, follow similar risk assessment and management procedures.

Central risks at the project site include working at height, sharing information between various actors, and working in winter conditions. A risk assessment is performed before each construction work. The identified risks are communicated to all contractors and builders active at the site. Everyone working at Fennovoima or on the Hanhikivi 1 project has the right to refuse to perform unsafe work.

With the occupational safety training, we ensure that everyone working for Fennovoima or at the Hanhikivi 1 site has adequate knowledge and skills of the correct working methods and safety practices, and that everyone working at the construction site uses the required personal protective equipment.

Site inspections promote improvement of operations

We monitor occupational safety performance at two levels: procedures and practices. The monitoring aims at continuous development of working methods and the processing of observed deficiencies at an early stage, before any harm occurs.

Fennovoima's occupational health and safety management system was subjected to both internal and external audits in 2019. No deviations were discovered in the audits. Fennovoima also audited the occupational health and safety management systems of RAOS Project and Titan-2, and participated in inspections by the authorities at the construction site.

Safe working environment is created together

Fennovoima and RAOS Project together carried out an occupational safety inspection of the contractors at the construction site. Fennovoima also conducted targeted Hazard Hunt inspections that focus on one area at a time; examples include inspections of all lifting aids being used at the site, or the chemical storage facilities. Observations made during the inspections are recorded, and any required corrective actions are made clear to the contractors.

Safety violations are processed in accordance with the regular safety observation or accident investigation procedure. Fennovoima has zero tolerance of working under the influence of alcohol. We carry out alcohol testing several times a week.

No lost-time accidents at the Hanhikivi headland

In 2019, a total of 548,533 working hours were recorded at the construction site. There were no occupational accidents leading to absences. At the end of the year, 21 months had passed without accidents.

Fennovoima's own personnel had two accidents leading to absence when two workers slipped outside the workplace on the sidewalk in winter weather, one at Pyhäjoki and the other at Salmisaari. These accidents led to eight days' and 15 days' absence, respectively.

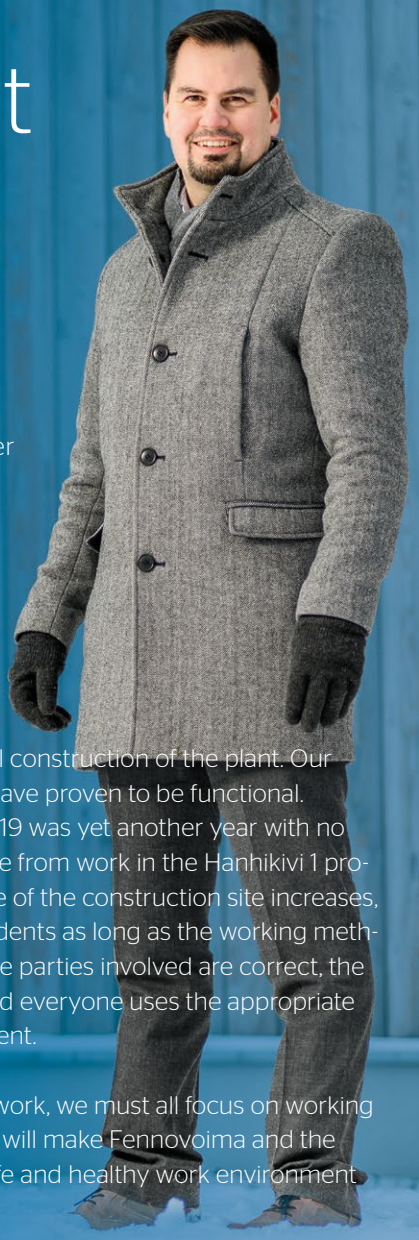
Over the course of the years, I have met several people who have had their health affected due to an occupational accident. In my opinion, that is not right – all employees should be able to return home healthy every day. Likewise, investments in occupational health and safety are in the best interests of the employer and society as accidents often cause significant harm also to them.

Our goal is to ensure that nobody's health or safety is compromised because of the work they do in the Hanhikivi 1 project. All involved parties as well as all organizations and people working in the project area must bear their responsibility for occupational health and safety. We all need to be aware of our responsibility, and we must act accordingly.

Safety comes from small things. An accident is usually the result of the combined effects of several issues, but we can influence this by ensuring that the occurrence of such issues is unlikely. Several minor non-compliances are often not considered as risk factors, but if several non-compliances occur in the same place, they will lead to an accident. That is why it is important to identify and eliminate even those minor risk factors from both the office environment and the project area.

It is good that we have had enough time to develop and test our OHS practices together with RAOS Project and Titan-2 before the start of the actual construction of the plant. Our established OHS practices have proven to be functional. I'm proud of the fact that 2019 was yet another year with no accidents leading to absence from work in the Hanhikivi 1 project area. Even when the size of the construction site increases, we will be able to avoid accidents as long as the working methods and the attitude of all the parties involved are correct, the instructions are followed, and everyone uses the appropriate personal protective equipment.

Every day when coming to work, we must all focus on working safely today. That is how we will make Fennovoima and the Hanhikivi 1 project area a safe and healthy work environment also in the future.



Olli-Pekka Pirilä
Occupational Safety Manager

Accidents at the Hanhikivi project site	2019	2018
Lost time injuries*	0	2
Lost working days	0	5
Average severity of accidents (as lost days)	0	2.5
Lost time injury frequency rate (LTIFR)**	0	4.04
Fatalities	0	0
Investigation of accidents and near misses	No accidents	Two accidents, one of which was investigated within the time limit.
High risk work	No	No

Accidents Fennovoima's personnel	2019	2018
Lost time injuries*	2	0
Lost working days	23	0
Average severity of accidents (as lost days)	11.5	0
Fatalities	0	0
Investigation of accidents and near misses	Two accidents, of which the investigations are finalized but not within the time limit.	No accidents
High risk work	No	No

* a) First-aid-level injuries are not included in the IR; b) fatalities are included in the IR; c) "lost day" indicates the loss of one full work shift; d) "days" means scheduled work days; e) count begins from the day after the accident (one full work shift). If the injured person is treated on the day of the accident and he/she returns to work on the next day, the injury is reported as a first-aid case.

**LTIFR is calculated by number of lost-time accidents per million hours worked. A lost-time accident is an accident that causes an absence from work of at least one work shift.

You may find more information regarding our OHS practices from our website: www.fennovoima.fi/en/responsibility/occupationalsafety

ENVIRONMENT

The Hanhikivi 1 project is a positive climate action, the effects of which will be realized during the decades of electricity production without emissions that are detrimental to the climate. Before commissioning, Fennovoima's direct environmental impact is mostly related to the construction work carried out in the plant site.

We ensure that all work on the Hanhikivi headland is carried out in accordance with environmental legislation and the permit conditions, and that the environment and the wellbeing of the local residents are respected during construction work. Our ISO 14001 certified environmental management system is an important tool in this work.

Management of the environmental impact at the Hanhikivi 1 construction site is based on proactive identification of environmental risks. We assess environmental risks for the Hanhikivi 1 construction site as a whole from the perspectives of environmental impact, legislation, and permit conditions. At this stage of the construction project, important environmental risks include chemical and oil leaks, the spread of turbidity in the sea, and noise during blasting. We update our risk register four times a year.

All contractors working in the project area comply with a comprehensive risk assessment and risk management procedure. Furthermore, everyone working at the project site must be aware of the special characteristics of the Hanhikivi headland's natural environment, the access limitations in the area, as well as the environmental guidelines established for the construction site.

Project area is monitored with care

We monitor the progress of contracted work together with RAOS Project during weekly site monitoring rounds, and we assist the contractors in better management of environmental matters. We also perform monthly targeted environmental inspections that focus on matters such as fuel storage, oil spill prevention preparedness, or dust prevention methods. In 2019, we steered contractors during these monitoring rounds, for instance, in waste and chemicals processing practices and the prevention of minor oil leaks.

The authorities also carry out regular inspections of our procedures. The Centre for Economic Development, Transport and the Environment (ELY Centre) performed a periodic inspection related to the nuclear power plant's environmental permit in October. Based on the inspection results, the ELY Centre required actions to be taken to ensure retention of the natural water level of a gloe lake on the shore. According to the inspection results, site operations are in good condition, and no major deficiencies were detected.

Permit matters

In April 2019, the Supreme Administrative Court issued its judgement on complaints filed against Fennovoima's environmental and water permit. The Supreme Administrative Court rejected all complaints, and the permit is legally valid. The environmental and water permit applies to operations and emissions during the operation of Fennovoima's nuclear power plant, as well as the intake of cooling water.

In 2019, we continued with the preparation of the nuclear power plant's chemical permit application. Such a permit is required for large-scale processing and storage of hazardous chemicals during the operation of the nuclear power plant.

Environmental impact management	2019	2018
Violations of permit conditions	No	No
Violations of environmental laws and decrees	Two violations: 1. Disturbance of the natural water level of the gloe lake, 2. A leakage of waste water into the ground when canteen's broken waste container was lifted.	No violations

Environmental impact monitoring

There are extensive protected seashore meadows, overgrowing shallow bays, and gloe lakes, which have become isolated from the sea on the Hanhikivi headland. There is a Natura 2000 conservation area approximately two kilometers from the plant area. Areas of high natural value have been left outside the plant area already at the construction planning phase.

We monitor the state of the environment together with RAOS Project in accordance with a jointly agreed environmental monitoring program. In addition to the environmental monitoring required by the permit conditions, we also carry out voluntary monitoring of the environmental impact. This allows us to ensure that we have comprehensive knowledge of the state of the environment in the Hanhikivi headland.

OBJECT	RESULTS IN 2019	MONITORING METHOD
Environmental monitoring		
Air quality	No increased volume of dust outside the project area. We monitor the quality of the air, especially in close proximity to nature conservation areas.	Five monitoring points
Noise	Noise was caused especially by piling work in the cooling water discharge area. The recommended values were exceeded several times, both during the day and at night. The average noise level at the different measuring points in 2019 was 30–68 dB (30–68 dB in 2018). A level of 30 dB corresponds to the sound of a whisper, and 65 dB corresponds to a normal speaking voice or laughter.	Seven measuring points; the one closest to residential areas is approximately 1 km from them.
Seawater quality	No changes in water samples caused by construction activities.	Monitored five times a year with water samples taken from ten measuring points.
Turbidity	Monitoring revealed a natural increase in turbidity due to heavy rain and storms. The values exceeded five times the limit where work must be interrupted, but no water construction work was in progress at the time. Breakwaters that are currently under construction, a protective embankment built in the sea to prevent the spread of turbidity, and a protective curtain placed in the water limit the spread of turbidity from the construction area.	Monitoring using continuous measurements takes place. There are five measuring points around the Hanhikivi headland and two in the marine spoil disposal area.
Fish stock	Total fish catch, species-specific fish catches, and average lengths of the fish species were studied. On the basis of the data collected, no changes that were clearly caused by water construction work could be detected in the structure of the fish stock. The most significant detected change deviating from the reference area was a reduction in the average size of roach. The underlying reason may be that larger roaches that feed on the bottom have moved away from the area.	Follow-up study
Oil and chemical leaks	No significant oil or chemical leaks occurred in the project area.	Subcontractors report all accidents to Fennovoima or RAOS Project in accordance with the construction site responsibilities.
Protected species and nature conservation areas		
Seashore meadows	Spreading of reed beds in the seashore meadows was detected. Occurrences of Siberian primrose have declined. Due to this observation, the status of all occurrences will be studied in more detail when Siberian primrose flowers in 2020.	Follow-up study
Gloe lakes	Changes in the water level of a gloe lake were detected in August. An investigation and related actions were immediately initiated. According to the observations made, a nearby clarification basin could be the underlying reason behind the rise in water level. The use of the settling basin was discontinued and it will be retaken into use once we are sure that the natural water level fluctuation in the gloe lake has been ensured.	Annual follow-up
Relocated species	No significant changes were detected during the studies. The number of moor frogs had slightly decreased from the previous years, but the change is assumed to be a result of the dry summer. Furthermore, the follow-up study was realized later in the summer than in the previous years.	Annual follow-up

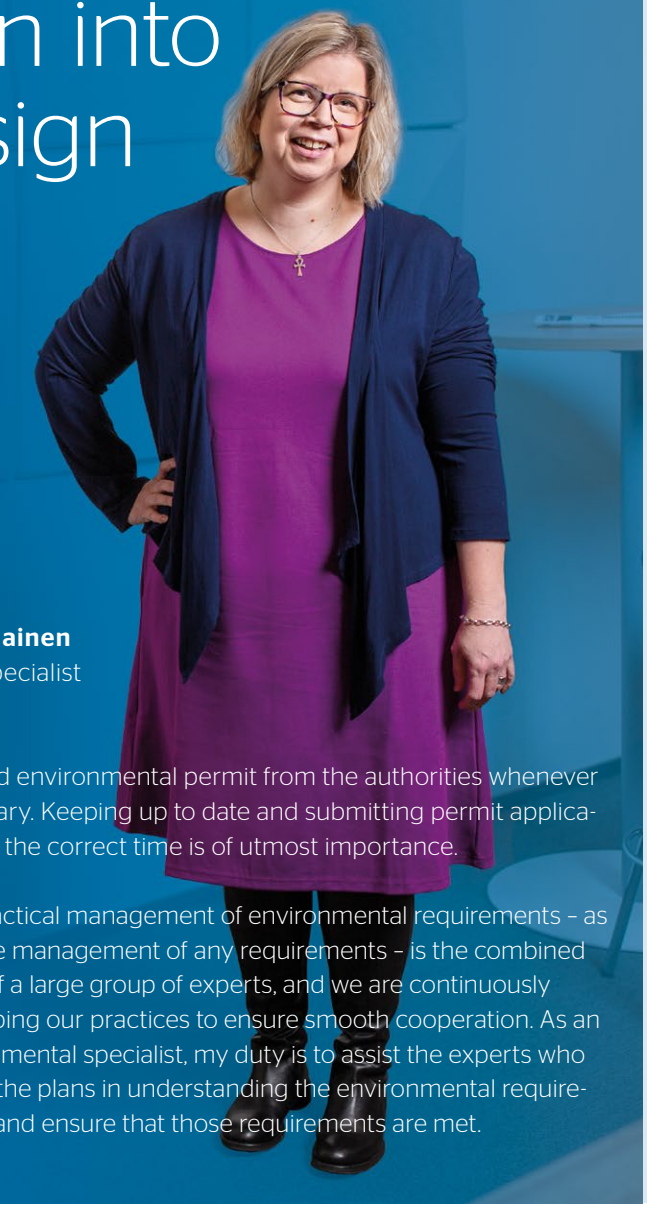
Environment is taken into account in plant design

We ensure that all work in the project area on the Hanhikivi headland is carried out in a manner that ensures environmental protection and the wellbeing of the local residents. The same principle will also apply to the operational phase of the plant; this is ensured through the plant design.

There are approximately fifty environmental permit requirements for the plant. Some of them are extremely detailed, while others are more general in nature. The requirements involve water supply, emissions into the water and air, noise, the processing of waste, chemicals and chemical releases, as well as the monitoring of the environmental impact, for example. The thermal load from the cooling water in the immediate vicinity of the plant is the plant's most significant environmental impact.

Changes caused by the progressing plant design and amendments to environmental legislation impose their own challenges on the management of environmental requirements.

We applied for an environmental permit fairly early on in the process, which means that changes made in the plant design will also influence the environmental requirements. Furthermore, some legislative amendments have been made since the submission of the permit application. This means that we must continuously check the compatibility of the plant design, statutory requirements, and permit conditions. We apply for an updated environmental permit from the authorities whenever necessary. Keeping up to date and submitting permit applications at the correct time is of utmost importance.



Paula Saavalainen
EHS Specialist

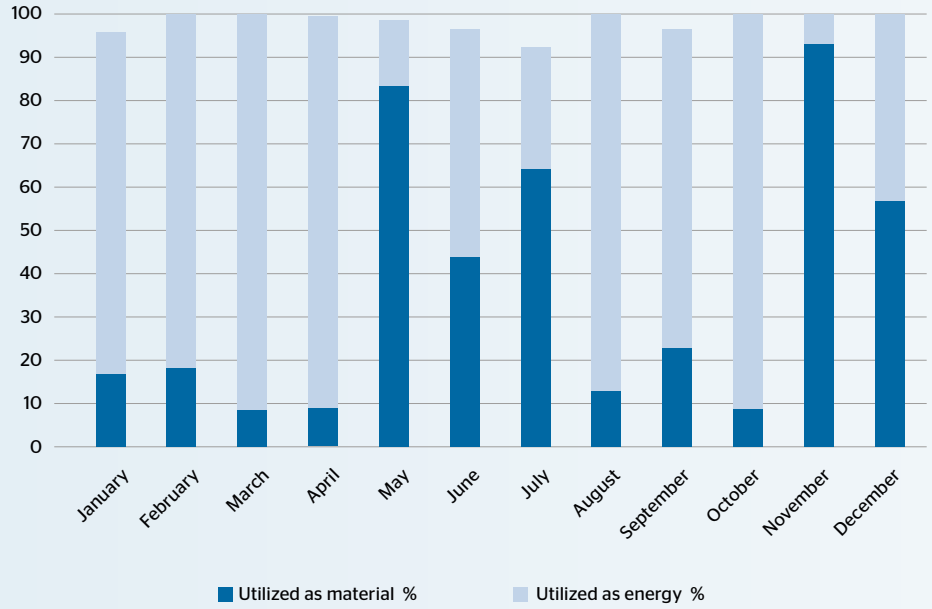
The practical management of environmental requirements – as with the management of any requirements – is the combined effort of a large group of experts, and we are continuously developing our practices to ensure smooth cooperation. As an environmental specialist, my duty is to assist the experts who review the plans in understanding the environmental requirements and ensure that those requirements are met.

Construction waste is utilized as energy or material

Efficient sorting and recycling, as well as appropriate processing, are important parts of the management of the environmental impact of the waste generated on site.

Contractors must sort the waste in their own work areas before transporting it to the project area's sorting locations. Contractors must also manage the processing and storage of hazardous waste in accordance with the applicable regulations. Despite instructions, we still detected negligence in the processing and sorting of waste at the construction site. We addressed the issue during the weekly site monitoring rounds and inspections, providing feedback and further instructions on procedures that meet the requirements set out in the waste management guidelines for the project area. In 2019, we also posted experts in the waste sorting areas to supervise and assist the contractors in the sorting of waste.

Utilization of construction waste as material or energy in 2019



Our goals are to utilize 70% of our construction waste as materials and to utilize a total of 90% of our construction waste either as materials or in energy production. We reached the overall goal (the total annual utilization rate was 98%), but the material utilization rate for the entire year remained at 55%. Spoil and rubble generated during excavation, rock blasting and dredging are utilized as filling and levelling materials at the construction site as far as possible.

Waste generated in the Hanhikivi 1 project area	2019 Metric tons (t), % of waste	2018 Metric tons (t), % of waste
Construction waste, including	**217 (75%)**	**526 (80%)**
- Wood waste	52 (24%)	123 (23%)
- Energy waste	53 (24%)	120 (23%)
- Concrete and brick waste	19 (9%)	50 (10%)
- Bitumen	31 (14%)	0 (0%)
- Mixed construction waste	16 (7%)	63 (12%)
- Combustible waste*	10 (5%)	9 (2%)
- Other waste**	36 (16%)	161 (31%)
Hazardous waste * **	**71 (25%)**	**160 (20%)**
Total	**287 (100%)**	**686 (100%)**

Most of the waste generated at the construction site is regular construction waste: metal, wood, concrete, rocks, biowaste, paper, cardboard, glass, or electrical and electronic waste. Our partner Remeo is in charge of transporting the waste from the site and appropriately processing it. Fluctuations in annual waste volumes are due to fluctuations in construction work in progress. * Combustible waste includes combustible material that cannot be recycled as material or energy, e.g. rubber, leather and aluminum packaging. ** The category "Other waste" includes metal, paper, cardboard, glass and biowaste that is recycled as materials. *** Hazardous waste includes, for example, waste oil, filters, batteries, oily rock material, and electrical and electronic waste.

LOCAL IMPACT OF THE HANHIKIVI 1 PROJECT

The Hanhikivi 1 project has an impact on the living environment and everyday life in Pyhäjoki and in the neighboring municipalities. Active participation in regional development together with public, private and third-sector improves the area's capabilities to prepare the region for changes brought about by the project, including the increased number of residents and the volume of services needed.

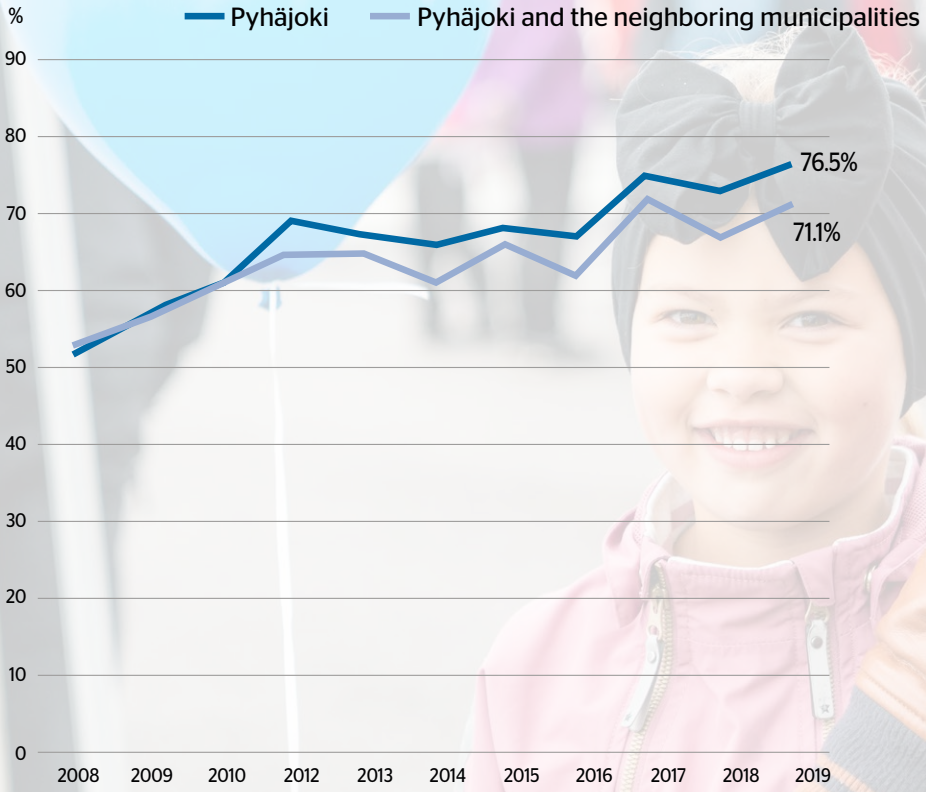
The construction of the new nuclear power plant has a significant impact on the regional economy and employment rate. The construction project generates new investments, creates jobs in the region, and increases tax revenue. With the increasing number of residents and stable municipal economy, the selection and availability of public and private services in the region improves, which benefits all local residents.

The construction work also has some negative effects on the living environment, such as increased volumes of heavy traffic and temporary turbidity in the seawater caused by water construction work. Some of these negative impacts cannot be avoided, but we openly communicate about the work in progress and any disturbances that it is expected to cause.

Support for the nuclear power plant project strengthened

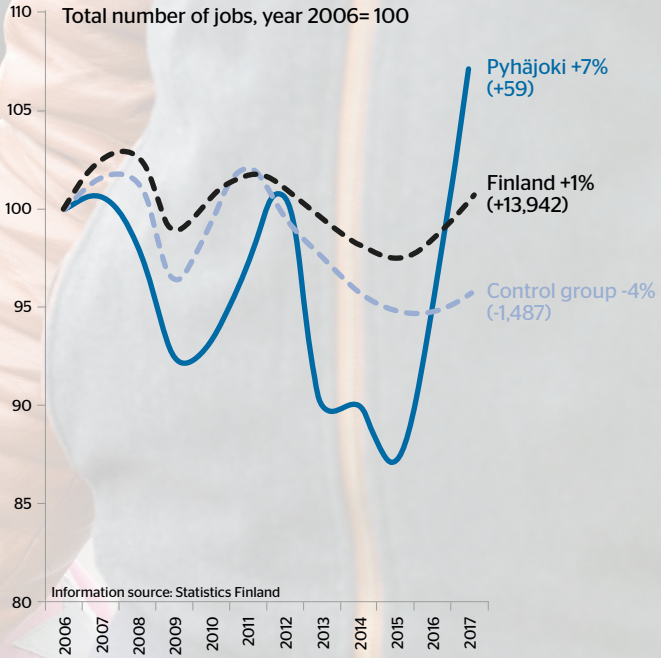
According to a survey carried out by Norstat Finland Oy in October and November, 76.5% of the residents of Pyhäjoki are in favor of the Hanhikivi 1 project. A total of 71.1% of the residents in the entire survey area have a positive attitude towards the project. Support for the project has strengthened the most in Raahe.

Local support for the project



Development of support for the project in 2008–2019 in Pyhäjoki, and in Pyhäjoki and the neighboring municipalities (Norstat Finland Oy).

The number of jobs is increasing



The number of jobs in Pyhäjoki started to increase in 2016. Control group = Kalajoki, Alavieska, Siikajoki, Haapavesi, Siikalatva, Ylivieska, Merijärvi, Oulainen, and Raahe.

Effects of the Hanhikivi 1 project are visible in the area

"The project has boosted the vitality of the area. Also, the municipality, companies and entrepreneurs have been actively involved. It has brought more jobs and other positive effects."

Woman from Pyhäjoki, 45-59 years old

"Positive thoughts. I wouldn't have moved back to my home town if there wouldn't be work for me here now."

Man from Pyhäjoki, 15-29 years old

"I've heard that the project has had a significant impact on the livelihood of entrepreneurs as they have got Fennovoima as their client."

Man from Pyhäjoki, 30-44 years old

"There is some residential construction going on in Raahe. Preparations have been made. The construction of the power plant has been seriously delayed, however."

Man from Raahe, over 60 years old

"Nuclear power is generally good because it's emission-free. But of course, when you think about nuclear waste, it makes you wonder. However, I don't want to rail against the project. I would feel disappointed if the whole process falls flat."

Woman from Pyhäjoki, 45-59 years old

"My son studied engineering with the idea that maybe there will be a job for him in the project. The employment effects are of interest to us. It remains a question if the project will be completed, since there has been opposition as well."

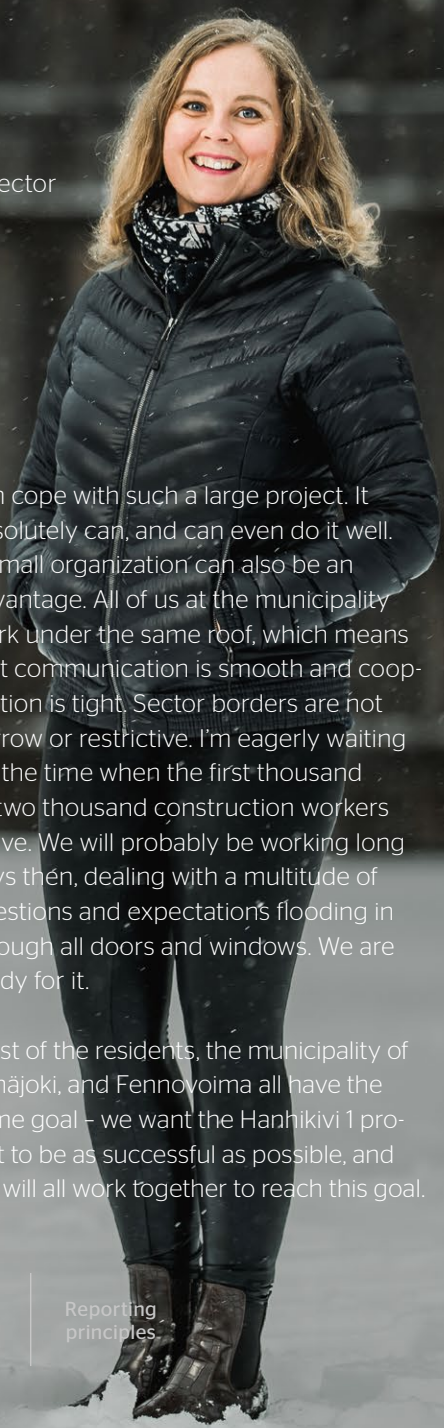
Woman from Kalajoki, over 60 years old

Excerpts from the open responses to the opinion poll conducted by Norstat Finland Oy in October-November 2019.

Pyhäjoki is ready for the challenge

GUEST WRITER

Helena Illikainen
Economic Development Director
Municipality of Pyhäjoki



Pyhäjoki has been preparing itself for the start of the construction of the nuclear power plant on all fronts for several years. At present, we have several ongoing projects that are preparing us to receive the new companies and residents without compromising the needs and wellbeing of the current residents of Pyhäjoki. We have constructed new infrastructure, developed the downtown area, and zoned new residential and commercial sites; for example, the construction of approximately 350 homes will start very soon.

We have also developed community integration services to ensure that we can serve the people who have decided to move or are considering moving here as comprehensively as possible, while supporting the current residents in adapting to the change. We can assist people in finding a home, help their spouses to find a job, and help with interpretation between Finnish and foreign languages when they are communicating with the local service providers, when needed. We encourage local associations and organizations to be actively involved in the process of greeting the newcomers, who are also potential new members.

It is clear that the future of Pyhäjoki would not be bright without the Fennovoima project. Pyhäjoki would be just another rural municipality where people are aging and the birth rate is decreasing. The new residents will use the services in the area and bring in revenue in the form of rents to private persons and the municipality, for example. Real estate tax will become a hefty source of income for the municipality, which will compensate for the funds invested up-front by the municipality in the preparations.

The atmosphere in Pyhäjoki is peaceful and expectant. The consistent communications by Fennovoima and the plant supplier on the schedule and news on the progress of the project have been happily received. Perhaps we have also become used to the fact that schedules are changed and specified along the way in the case of a large-scale project. On the other hand, the delay in the construction schedule has offered the municipality of Pyhäjoki and the entire area more time to prepare and the residents more time to adapt to the situation. I believe that this has honed our skills and made us a better, more responsive municipality.

Fennovoima is a visible actor in the area, and cooperation with Fennovoima's employees is varied and smooth. In my opinion, the increased support for Fennovoima is a clear result of the company's open and transparent actions. Furthermore, difficult issues have not been swept aside; in most cases, they have been integrated into the discussion. The fact that local associations and organizations are supported through sponsorships also indicates to us that Fennovoima wants to be part of the community and bear its social responsibility. The municipality also wants to be a responsible organization in the comprehensive cooperation network that has sprung up around the project.

Sometimes I hear someone on the outside ponder whether a small municipality can cope with such a large project. It absolutely can, and can even do it well. A small organization can also be an advantage. All of us at the municipality work under the same roof, which means that communication is smooth and cooperation is tight. Sector borders are not narrow or restrictive. I'm eagerly waiting for the time when the first thousand or two thousand construction workers arrive. We will probably be working long days then, dealing with a multitude of questions and expectations flooding in through all doors and windows. We are ready for it.

Most of the residents, the municipality of Pyhäjoki, and Fennovoima all have the same goal – we want the Hanhikivi 1 project to be as successful as possible, and we will all work together to reach this goal.

Implementation quality

By high-quality implementation of the nuclear power plant, we mean that the plant is safe, complies with Finnish legislation, regulations and the plant supply contract and produces the agreed volume of electricity. Supply chain readiness is one of the key factors in ensuring high-quality construction of the plant.

High-quality implementation requires a high-quality supply chain

By high-quality implementation of the plant, we mean that the plant is safe and complies with Finnish legislation, regulations, and the plant supply contract, as well as produces the agreed volume of electricity. Related to all of this, there are a lot of matters that need to be achieved before we are ready to start the construction of the plant.

Supply chain readiness is one of the key factors in ensuring high-quality construction of the plant together with the plant supplier and subcontractors participating in the construction and manufacture of plant components. Performance of the plant supplier's supply chain and quality management in accordance with the safety significance are key development areas in terms of the readiness.

We aim to ensure that the plant supplier and the main contractor have good understanding of the plant's availability requirements and the Finnish quality requirements and procedures. Another essential factor is them operating in accordance with the requirements and being capable of ensuring that their supply chains also comply with the requirements. It is also in our best interest that everything goes smoothly and efficiently in the supply chain and there are no delays. However, there is still work to be done in all of this.

We have established a new quality control unit in the Fennovoima organization and reorganized component design and quality specifications in accordance with their safety significance. The plant supplier has also implemented this approach based on safety classes.

At present, we are in the process of harmonizing the monitoring and supervision procedures used in component manufacture with the plant supplier. The goal is to determine sufficient supervision methods for all safety-classified components and structures.

As the I&C supplier has now been selected, all the main suppliers for the Hanhikivi 1 plant have been selected and approved by us. The determination of roles in the I&C supply chain must be completed as soon as possible so that technical design can start and we can compile the related construction license documentation– otherwise I&C design could become a bottleneck for us. The most challenging aspect is that there are several subcontractors in the I&C supply chain already at this early stage. We will strive to simplify the supply chain to determine the responsibilities and supervision methods in the supply chain as accurately as possible. This will facilitate the management of the implementation process.

All in all, both us here in Fennovoima and the plant supplier are on the right path in terms of supply chain management. We discuss the available options with the plant supplier and plan the operations together. We still have plenty of work to do, however, to make the supply chain compliant with the Finnish requirements so that we can start construction as soon as the construction license has been granted.

Jouni Takakarhu
Project Director

SUPPLY CHAIN MANAGEMENT

The most important aspect of a nuclear power project's supply chain management is ensuring safety. Deliveries that are important for safety are subject to a higher number of requirements that are also stricter than the requirements set for deliveries which have no nuclear safety significance.

Such deliveries can only be acquired from suppliers who have prerequisites for operations that meet the statutory safety requirements and who have adopted audited quality management and quality assurance procedures.

Established in spring 2019, the duty of the Fennoforum 3 working group is to verify that the supply chain and its management will be ready at the appropriate time to start the construction phase. In 2019, the working group started the creation of functional assessment models based on the safety classes for the most important suppliers.

Delivery requirements are divided into clear and understandable technical entities in accordance with the safety classes. This also verifies correct allocation of the requirements in the of supply chain and allows us to specify adequate control methods for all of the plant's safety-classified components and structures.

Other important focus areas in the work have been assessing the suppliers' resource management and qualifications, as well as ensuring that the plant supplier and the main contractor have internalized the Finnish and European nuclear construction requirements.

In 2020, the experts in Fennoforum 3 will focus on the further development of the above-mentioned control plan and assist the plant supplier in the development of supply chain control plans.

Development of the supply chain in 2019

The French company Framatome SAS and Siemens AG were selected as the main I&C suppliers. According to the contract, Framatome will supply the safety automation systems and Siemens will be the operational I&C systems supplier. With this contract, all the main suppliers for the Hanhikivi 1 project have now been selected.

Furthermore, two companies were approved as the fuel assembly suppliers and one company was approved as the supplier of zirconium alloy products in the supply chain of the fuel supplier TVEL. In the supply chain of the plant supplier RAOS Project, the scope of supply of the main designer Atomproekt was expanded to also cover designer supervision services of the construction of the Hanhikivi 1 nuclear power plant.

The manufacture of plant components started with the manufacture of the turbine generator rotor in Japan.

We audited all subcontractors of the Hanhikivi 1 project that are significant to nuclear safety. We also participated as an observer in nearly all of the audits performed by the plant supplier on its subcontractors.

FENNOVOIMA'S SCOPE OF SUPPLY	2019	2018	2017
Subcontractors total	329	273	184
Of whom Finnish	82%	83%	84%

RAOS PROJECT'S SCOPE OF SUPPLY	2019	2018	2017
Subcontractors total	904	754	524
Of whom Finnish	80%	80%	80%

The tables include all subcontractors approved for the supply chains by the end of 2019.

Supply chain assessments

We actively monitor the development of the plant supplier's supply chain. Last year, we used a new assessment method to assess the performance of key actors in the supply chain with the goal of identifying the suppliers' most urgent and most demanding development areas. Assessed aspects included for example management, ERP systems, processes, quality operations, certificates, and facilities. The assessment method we use is very illustrative and enables us to create an overall picture of the status of each supplier and also the status of different entities of the supply chain.

As expected, the assessment results indicated variation in the readiness and development areas of the suppliers. For example, many of the suppliers still need to develop their resource allocation and their understanding of the requirements, while the facility readiness of many of the suppliers is at good level.

Cultural differences are still clearly visible, particularly at the project site in the Hanhikivi peninsula, in the safety culture, work supervision, and recruitment of construction employees, for example. We are working hard to guide the main contractor, in particular, so that they could reach the level of readiness required to start the construction of the plant. We are of the opinion that the operations have slowly proceeded in the correct direction.

Tatu Hietala
Supply Chain Manager

In 2020, we will carry out a more detailed supply chain assessment covering all suppliers significant in terms of nuclear safety. On the basis of the assessment results, we will set goals linked to the project's intermediate milestones for each of the important suppliers and create them development plans covering the observed development areas. This is to ensure that the different parties active in the supply chain will be ready to deliver the components included in their scopes of supply or to start construction at the right time.

Ethical requirements apply to all suppliers of the Hanhikivi 1 project

Socially significant ethical issues involving the supply chain, such as anti-corruption, human rights obligations, and the management of environmental matters are guided by means of contractual terms, verified by means of audits, and also taken into account in project planning. All the key participants in the project must also have an environmental management system compliant with ISO 14001, and an occupational health and safety management system that meets the requirements of OHSAS 18001 or ISO 45001.

We conduct a pre-evaluation of ethical conduct that is implemented as part of supplier pre-selection queries for companies who wish to be part of Fennovoima's direct supply chain. In 2019, we carried out ten compliance and ethical conduct audits as part of our more extensive audits. For the assessment, we gather information about the potential contractual partners' policies, codes of conduct, oversight procedures and violations, among other things, with regard to matters such as anti-corruption, securing human rights and managing occupational safety and environmental matters.

Safety culture in the supply chain

We continuously monitor the level of safety culture in the supply chain. The

safety culture of the project's main contractor Titan-2 has been monitored with special care due to deficiencies observed at the project site. Titan-2 has clearly improved its actions to develop the safety culture and to achieve an open atmosphere at the project site. Changing a company's safety culture always takes time, however. At present, Titan-2's approval as the main contractor is conditional. To renew our approval, we require that the company provides more evidence of the improvement of its safety culture, among other matters, by the end of 2020. During this period, we will increase our efforts to support and monitor Titan-2's safety culture development.

In addition to Titan-2, we conducted audited safety culture audits of the other key suppliers – RAOS Project, AEM Technology (Kolpino), and Gidropress – in 2019. Furthermore, RAOS Project conducted safety culture audits of Atomproekt and Atomenergomash. We participated in these audits as an observer.

On the basis of the audit results and the safety culture observations we have made, there is some variation in the safety cultures of the project's key suppliers. Many of the companies still have plenty of room for development, but we also made some positive observations. In general, the safety culture of the companies is improving.

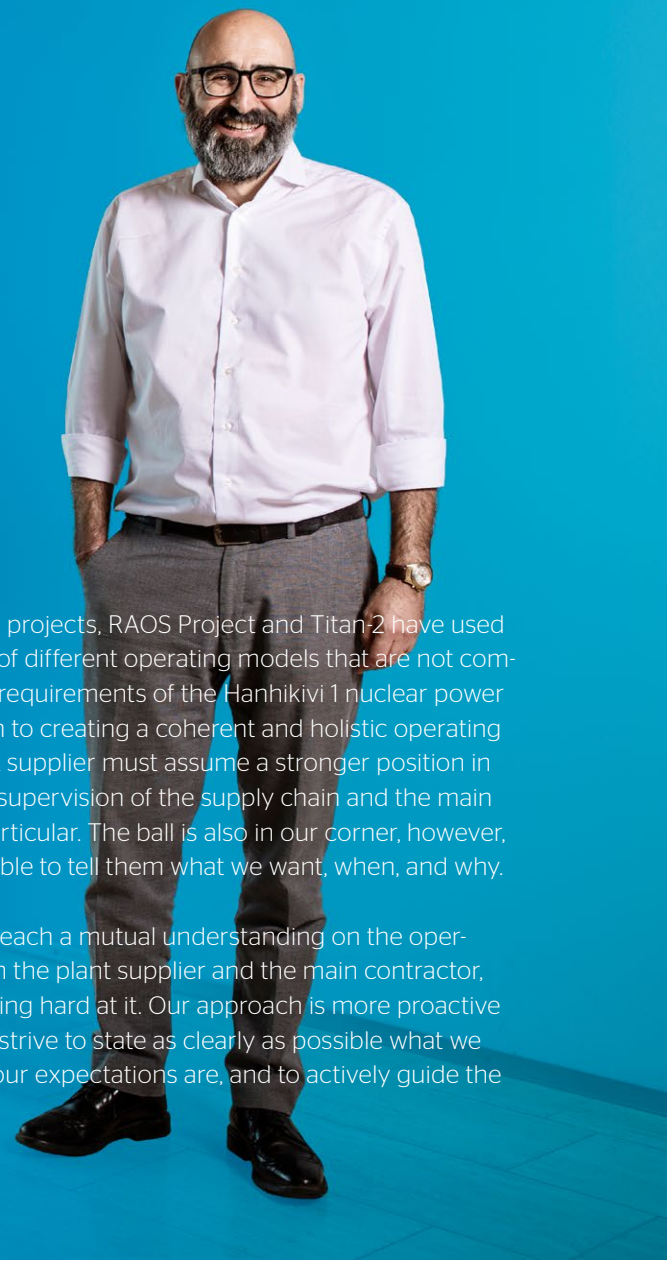
Inspection operations

Now, as I look back at the past year, I can only state that Fennovoima and our operating model underwent quite a change over the course of the year. The year had its fair share of speed and dangerous situations. Most of the changes were positive.

Our quality inspection functions, for which I am responsible, were also reorganized during the year. We gathered almost all of our inspectors under the same roof to the inspection unit. The reform allows us to better verify the independence of our own inspections from the rest of the organization, and to develop our operations.

The inspection operations focus on verifying the compliance of concrete physical products or structures. The activity is fairly black-and-white: the product being inspected either complies with the requirements, in which case it is approved, or fails to meet the requirements, in which case it is rejected. There is no middle ground. In accordance with the nuclear safety principles, we do not comment on how the product should be repaired.

In addition to Fennovoima's internal development, the inspection operations of the plant supplier and the main contractor need to be developed, and more inspection resources are needed. It has taken time for us to form a clear picture of how the plant supplier and the main contractor perceive the inspections and what kind of procedures they have.



José Martins
Quality Control Manager

In their previous projects, RAOS Project and Titan-2 have used a large number of different operating models that are not compatible with the requirements of the Hanhikivi 1 nuclear power plant. In addition to creating a coherent and holistic operating model, the plant supplier must assume a stronger position in the control and supervision of the supply chain and the main contractor, in particular. The ball is also in our corner, however, as we must be able to tell them what we want, when, and why.

We have yet to reach a mutual understanding on the operating model with the plant supplier and the main contractor, but we are working hard at it. Our approach is more proactive than before: we strive to state as clearly as possible what we want and what our expectations are, and to actively guide the operations.

We assessed the strengths and weaknesses of the companies' safety cultures in accordance with our renewed safety culture model. The model that we further developed in 2019 is based on international guidelines of the IAEA and WANO, statutory requirements, and our own safety culture principles. It consists of twelve dimensions (including management, decision-making, and openness of the atmosphere) that have been further divided into several subdimensions. The assessment model allows us to analyze the safety cultures of the companies and their development more accurately than before.

Manufacture of plant main components has started

The manufacture of the the turbine generator rotor was started last fall beginning the manufacturing the plant's main components. The generator is one of the most important components in the entire plant, as it generates electricity by converting the kinetic energy of the turbine into electrical energy. The generator rotor in turn, transmits that energy to the generator.

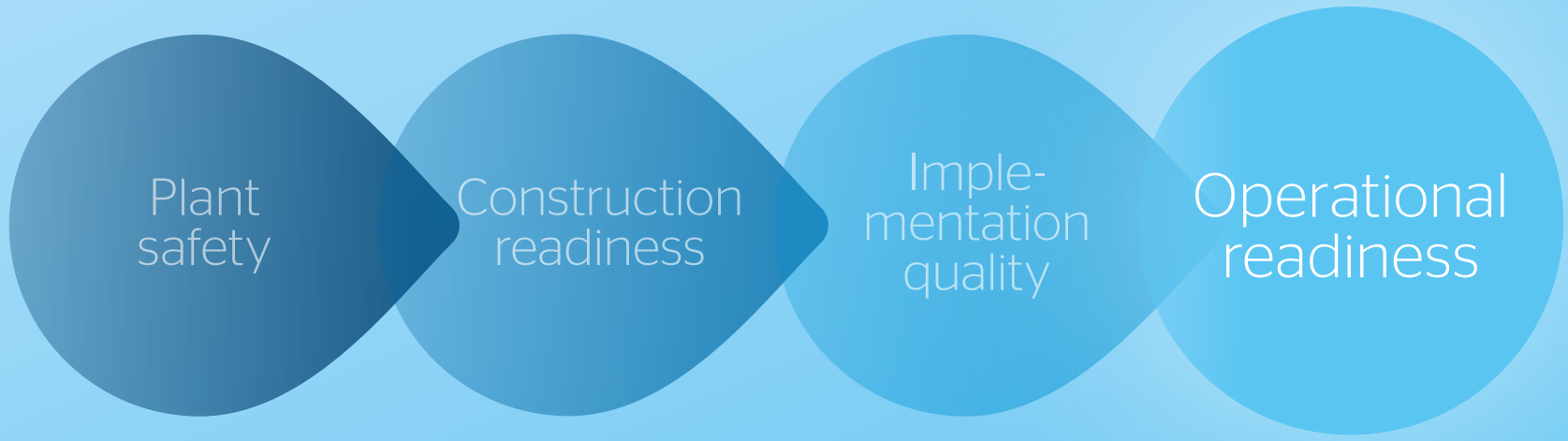
The rotor is an important component, but the start of its manufacture is also important for another reason: it has allowed us to clarify our practices to ensure that those support efficient manufacture once the full-scale manufacture of hundreds of plant components starts all around the world. We have also had the chance to further specify our expectations and the criteria we will use to grant permission to proceed with the manufacture.

It is clear that such a large-scale project will always include both expected and unexpected challenges. Therefore, we must have at our disposal the practices needed to resolve these matters. Over the course of the period of two and a half years preceding the manufacture of the rotor, we resolved – together with the parties involved – a multitude of matters relating to the interpretation of requirements, manufacturing plans, management systems, manufacturing control, and a variety of other matters. Meanwhile, we were also able to fine-tune our cooperation practices with the different parties.

By the way, due to the size and the mechanical and chemical requirements of the component, Japan Steel Works is the only supplier in the world that is capable of forging the rotor. The generator is classified as a non-nuclear safety component, which is why its manufacture can be started already at the nuclear power plant licensing phase.

Murat Agcay
Project Manager, generator and auxiliary systems

Tiina Partanen
Turbine Island Director



Operational readiness

We will be ready for the operation of the plant once the plant itself and the operating organization are ready for safe, cost-effective, and efficient operation of the plant.

Preparing for commissioning of the plant

Kim Stålhandske
Operational Readiness Manager

Miika Hyvärinen
Maintenance Manager

We will be ready for the operation of the plant once the plant itself and the operating organization are ready for safe, cost-effective, and efficient operation of the plant. In other words, the plant must meet the technical and safety requirements specified for it, be easily operable and maintainable, as well as be capable of producing the agreed volume of electricity. In addition to structural aspects, the organization's readiness requires, above all, the correct competencies and functional processes.

Our working group, Fennoforum 4, which focuses on the operational readiness of the organization, convened for the first time in early December. Naturally, work to ensure readiness had been going on throughout the organization already before the establishment of the working group. Fennovoima's renewed strategy pays more attention to the preparation for operation at all organizational levels. This year, we will focus on surveying Fennovoima's needs and development areas related to the operational phase to obtain a clear idea of all the key goals and duties. Later on, we will also investigate the readiness of all external parties important for the operation of the plant.

One of the most important factors influencing the successful commissioning of a plant is a competent organization. Organizational competence is continuously developed throughout the project. At the planning phase, this means technical training realized by the plant supplier, for instance. All Fennovoima employees are obligated to attend the training. In addition to training, the employees learn a great deal when reviewing the plant supplier's design documentation.

The plant's commissioning and testing phases are especially important for the operation and maintenance personnel, as these are the stages at which they need to internalize the operations of the plant. They will closely participate in different activities at the plant to get familiar with the entire plant and to learn how it works in practice. Practical training with simulators that are fully compatible with the plant is also extremely important when verifying the competence of the operating personnel.

The organizational readiness must be achieved in due time before the initial fuel loading. There are examples of power plant projects elsewhere in the world where the organization was not ready for commissioning once the plant was complete. Such situations have led to considerable delays in the start of electricity production and major financial losses. Getting ready on time is extremely important. In our opinion, we are proceeding well on schedule in terms of the development of operational readiness.

Our capacity factor goal is ambitious

We started an availability project together with the plant supplier last March, because we had noticed that we might have some challenges involving achievement of the agreed plant capacity factor. Every per cent of capacity factor is valuable, and the savings potential may amount to billions during the 60-year lifecycle of the plant.

Traditionally, VVER plants in Russia have not achieved capacity factors similar to that required from Hanhikivi 1. Through continuous improvement, the Loviisa VVER plants currently in operation in Finland have, however, reached a world class level despite the fact that they consist of older technology. Our capacity factor goal is highly ambitious – it is at the world class level.

The current plant design does not correspond to the availability requirements specified for the plant yet. We have therefore proposed modifications to the plant supplier to improve the plant's availability. Above all, the modifications aim at improving the plant's maintainability and shortening planned maintenance outages. The proposed modifications involve some of the systems and components to be purchased, for instance, and are based on methods, technologies, or practices that have been used and found functional in nuclear power plants elsewhere in the world.

Plant design is proceeding at a fast pace. The farther the design proceeds, the more challenging the implementation of any changes important in terms of availability will become. In 2020, we will ensure that the plant layout does not include any factors hindering availability that would be extremely difficult or impossible to correct through design modifications at a later point in time. From layout, we will gradually proceed to studying smaller entities all the way to the optimization of component-specific maintenance actions. Naturally, the impact of any modifications of the smaller entities will have a smaller impact on the capacity factor.

Ville Määttä
Project Manager,
Availability Maintenance

We are also eagerly awaiting for what will possibly be the most important document of the year, the first availability analysis report which will analyze the design phase capacity factor of the Hanhikivi plant. This will be the first official capacity factor of the plant.

I'm confident that we will reach our capacity factor goal despite the fact that we detected the availability challenges regrettably late. I'm more confident because the plant supplier is committed to finding solutions to the availability issues. The benefits from improved availability are mutual – we will reach our availability goals and the plant supplier will end up with a better plant design.

PLANT AVAILABILITY

Capacity factor is a figure which indicates the amount of time during a specific period for which a plant or a component is capable of performing a required action. In the case of a nuclear power plant, the capacity factor refers to the plant's ability to produce electricity to the network. The review period is usually one year.

At the plant design phase, we study availability in relation to time, i.e. for how long during the review period is the plant capable of producing electricity to the network at 100% capacity. Availability depends on, for instance, planned annual outages, unplanned shutdowns, plant modernizations, and any major repairs that were not scheduled in the maintenance planning.

An availability project started during the first half of 2019 aims to verify that the Hanhikivi 1 nuclear power plant will produce at least the volume of electricity specified in the plant supply contract for its shareholders. During the year, we analyzed the availability of VVER plants based on operating experience feedback data. We presented dozens of improvement proposals based on the analysis results and the expertise of our employees to further improve the availability of the plant.

We will continue to analyze the modifications and the key analysis object in 2020 will be availability of the plant layout. As part of the analysis, e.g. a plant maintainability analysis will be carried out.

Simulator preparations

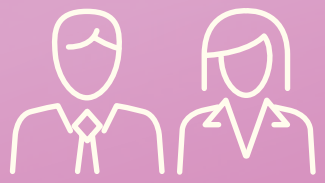
The simulator preparations for the Hanhikivi 1 nuclear power plant are proceeding and the prospective simulator supplier performed simulator quality planning in 2019. We have received a description of the implementation stages of simulator design, and we expect to receive the quality planning documentation as a whole for review soon.

The simulator delivery related to the Hanhikivi 1 nuclear power plant will consist of a total of three separate simulators: the training, development, and testing simulators. The training simulator will be used to train the control room operators. An exact copy of the plant's control room will be created in this simulator so that the operators can be trained in the operation of the plant as if they were inside the actual control room. Simulations are an extremely important part of control room operator's training. In addition to the normal operation of the plant, the training simulator will be used to practice what to do in case of a transient fault or accident. This will enable us to be prepared for even the most unlikely situations in advance. The development simulator will be used particularly to develop the control room operations and test the control room user interfaces. The testing simulator, on the other hand, will be used to test automation as part of factory acceptance testing before the delivery of the I&C of the plant.

More detailed simulator design can start once the simulator supplier has been selected and the design of the plant (incl. the control room) has reached a sufficiently detailed level. State-of-the-art technology will be used in the plant simulators, and the simulation models will correspond to the design of Hanhikivi 1 plant. The behavior of the plant can therefore be very accurately simulated whereby the training and test situations are realistic. The training simulator must be ready for training 18 months prior to the initial fuel loading.

Topi Tahvonen
Simulator Expert

In addition to the simulator design, I participated last year in the review of the plant's safety design in terms of the control room user interfaces and the plant's functional structure, which are part of my area of responsibility. However, an important part of the year and a great source of pride for me personally was the fact that I was mentoring a student preparing his master's thesis. My mentee graduated late in the year after having completed his master's thesis on modelling of the I&C architecture, and is now working here in Fennovoima's I&C team.



People and Competence

Committed and competent personnel is a prerequisite for the success of the Hanhikivi 1 project. Fennovoima's organization and its competencies must meet the statutory requirements set for each project phase. Our strengths in the global competition for nuclear power professionals are the interesting and challenging work, the opportunity to get involved in developing new nuclear power company operations and grow as a professional in a caring and encouraging work community.

ORGANIZATIONAL STRUCTURE SUPPORTS SUCCESS

A major reform of the organizational structure and operating methods was carried out in 2019 in a development project called Fennovoima Reprogrammed. The organizational change aimed at clarifying internal responsibilities, roles, and decision-making, as well as promoting in-house cooperation. Furthermore, the decision-making structure was made more versatile and flattened.

The new organizational model was introduced in April, and most of the changes were completed by the end of 2019. Most recruitments to new supervisory positions created by the structural change were made from within Fennovoima's own organization.

Based on feedback provided by the employees, the changes support the work and success in it, clarify the roles, and improve cooperation, but there is still room for development in internal communication within the organization. We will continue the development work according to the agreed organizational structure.

Recruitment and personnel changes

Timo Okkonen, DSc (Tech), was nominated as Chief Operating Officer in April. He has been in charge of the reprogramming of Fennovoima and serves also as the Interim CEO as of November 1, 2019, following the resignation of Toni Hemminki. A new Project Director, Oversight Director, Communications Director, Chief Information Officer, and Chief Legal Officer also started their work in the management team during the course of the year.

Personnel commitment and retention improved from 2018 by 3.1 percentage points. The voluntary employee turnover rate was 10.4% in 2019. The average number of personnel over the course of the year was 342 people.

Our recruitment needs for 2019 were moderate, and the focus was on longstanding nuclear power expertise in technical and project management positions. Many of the open positions were filled by means of internal job rotation. In a manner typical for project-natured operations, we complemented our organization's expertise with consultants working together with our own personnel. We will continue to strengthen our organization's internal competencies in the areas of automation, quality control, electrical, power plant, and turbine technology, nuclear safety, and project management.

We strive to hire new personnel who can start their work directly at the Hanhikivi project area. We will provide all of our employees with flexible ways of working in Pyhäjoki. We have worked in close cooperation with the region's municipalities for several years to ensure that the transfer of our personnel and their families to the new region will be as smooth as possible.

Fennovoima employees 345
In Helsinki 282
In Pyhäjoki 63

Female 30% Male 70%

Average age of the employees 42.6 years

Personnel total, including internal consultants 417

New permanent employees 56

Growth of the organization at the end of the year 32 people

Outgoing employees 36
Voluntary employee turnover 10.4%
(2018: 13.5% and 2017: 9.6%)

Average training hours 43
(2018: 50 hours)

We rewarded a total of 26 employees for their excellent work with a sum corresponding to their salary for one month.

LEARNING ORGANIZATION

We support continuous learning of our employees by a variety of means. We have several training courses that are mandatory for all employees, and we also provide many voluntary courses to support the employees' professional competencies. Visits to the Hanhikivi plant area are also an important part of getting familiar with the project. VVER plant technology training arranged by the plant supplier will continue in 2020.

In addition to the in-house training courses and training outside the company, learning by experience is essential in the nuclear power industry. Fennovoima engineers, in particular, visit peer companies to observe how other nuclear power companies operate in different parts of the world. Such visits are organized by the World Association of Nuclear Operators (WANO), for example. Furthermore, several Fennovoima employees participate each year in a complementary training course on nuclear safety and nuclear waste management that is for all operators in the nuclear industry.

In fall 2019, we adopted a new competence management system that provides us with better tools to help our personnel in developing themselves professionally and to monitor their performance. In early 2020, we replaced Competitiveness Pact working hours with a new practice where we encourage the employees to use the

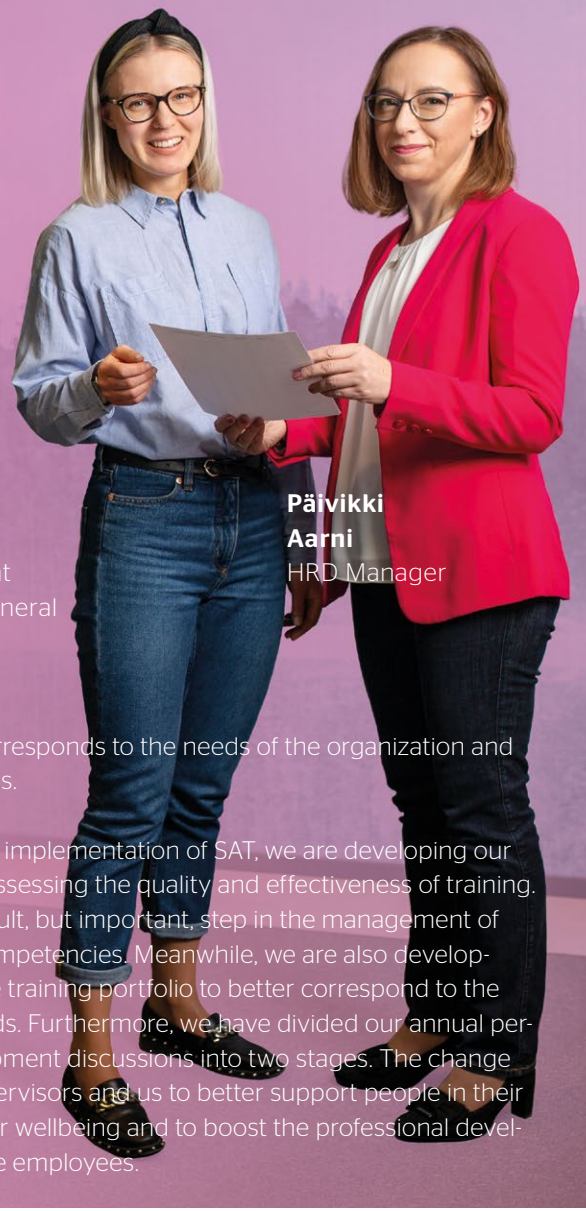
Competence development is based on the needs of the organization and the employees

At present, our most important task is to ensure and verify that Fennovoima has sufficient competencies for the construction phase. Meanwhile, we are preparing for the competence requirements of the operational phase.

The planning of competence management is based on competence model that we have developed for the needs of Fennovoima and the plant. It describes Fennovoima's key competence areas at each project phase. The model is also used as the framework when reviewing the adequacy of the resources, competencies, and development areas of the different teams. When necessary, we support the teams by training, recruiting new personnel, or by providing them with consultants to support their work.

We are about to switch to a systematic approach to training (SAT) in the planning and development of training. It is a well-known five-tier method recommended by the international nuclear industry organizations WANO and IAEA. It allows us to ensure that the training we offer is current and of a high quality, and that it corresponds to the needs of the organization and the employees.

As part of the implementation of SAT, we are developing our methods of assessing the quality and effectiveness of training. This is a difficult, but important, step in the management of personnel competencies. Meanwhile, we are also developing our online training portfolio to better correspond to the project's needs. Furthermore, we have divided our annual personal development discussions into two stages. The change allow the supervisors and us to better support people in their work and their wellbeing and to boost the professional development of the employees.



Emmi Hanhimäki
Development Manager, General Training

Päivikki Aarni
HRD Manager

24 annual Competitiveness Pact hours to develop their competencies or do voluntary work in compliance with Fennovoima's responsibility principles.

HIGH PERSONNEL WELLBEING

By investing in wellbeing at work and a good working atmosphere, we also support productivity, commitment, and motivation. A functional organizational structure, high-quality management practices, and opportunities for professional development, among other similar factors, are the key to a prosperous workplace community.

Top and middle management, employees, and the occupational health care services develop wellbeing together as a shared effort. The occupational health and safety committee, OHS representatives that the personnel elect from amongst themselves, and a personnel representative are also involved in the planning and implementation of actions to promote wellbeing.

We monitor wellbeing

We monitor the wellbeing of our employees through, for instance, personal development discussions and personnel satisfaction surveys.

In early 2019, we carried out a workplace survey focusing on health effects of the work and the workplace. With the survey, the occupational health care provider assessed health risks, physical and psychosocial factors contributing to work load, and the work arrangements. The project-natured work and the project delays were reflected in the results. On the other hand, the employees felt that they could influence their own work and were supported by their supervisors. They also considered the training and development opportunities provided by the organization good.

In the summer, we also arranged a health survey for all employees in cooperation with our occupational health care provider. The response rate was 63%. The occupational health care provider contacted all employees whose results indicated the need for a health check. Personal treatment plans were designed for the employees as necessary.

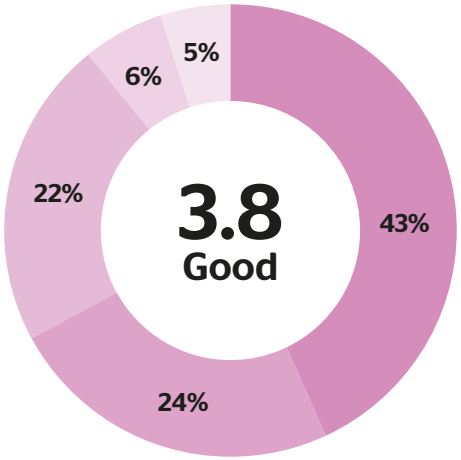
According to the Työvire survey carried out in the fall, 67% of the employees have good or excellent work motivation (72% in 2018). The total occupational wellbeing score was 3.8, which is the same as in 2018. The survey provides an overall idea of occupational wellbeing, safety at work, and the mental and physical stress caused by the work.

New working hour model

We want to offer our employees the opportunity to do their work flexibly, and we want to support location-independent work. In 2020, we will introduce Fennovoima's new working hour model in stages. It will provide the maximum working hour flexibility allowed by working hour legislation and the collective labor agreement: we will, for instance, further extend our flextime and shorten the permanent working hours. Work done outside the workplace will also be included in the working hours.

The more freedom the employees have to decide upon their own working hours, the more responsibility they carry on their own wellbeing. That is why we instruct supervisors to pay special attention to their own wellbeing and the wellbeing of the others.

Personnel wellbeing



First safety culture self-assessment

Good safety culture is about respecting safety, having the right understanding of safety and dangers, being alert, bearing your responsibility, and ensuring that there are good prerequisites for working, among other things. Structural and technical factors in the organization also influence the safety culture.

In early 2019, we carried out Fennovoima's first safety culture self-assessment. The assessment method we used is based on the safety culture framework of the International Atomic Energy Agency (IAEA) and Fennovoima's own safety culture principles. Praise should also go to Fennovoima's own safety culture ambassadors, who were responsible for the practical implementation of the self-assessment with the help of a safety culture specialist.

Both development areas and strengths were identified with the self-assessment. The observed development areas included the need to clarify roles and responsibilities, to strengthen leadership for safety, and to improve cooperation and information flow within the organization. Identified strengths of the organization are the possibility to report observations and thus assist the organization in learning, opportunities linked to the Fennovoima Reprogrammed development program, good atmosphere at work, and support for employees in the development of their competencies.

On the basis of the results, we were able to determine that Fennovoima's safety culture has somewhat improved since an independent assessment by VTT Technical Research Centre of Finland in 2017. VTT's assessment stated that the level of Fennovoima's safety culture is adequate.

The development and assessment of the safety culture will continue throughout the lifecycle of the nuclear power plant. Changes do not take place overnight: they require time. The most important aspect is that the safety culture must not be merely empty words, but an integrated part of the organization's daily operations and management.

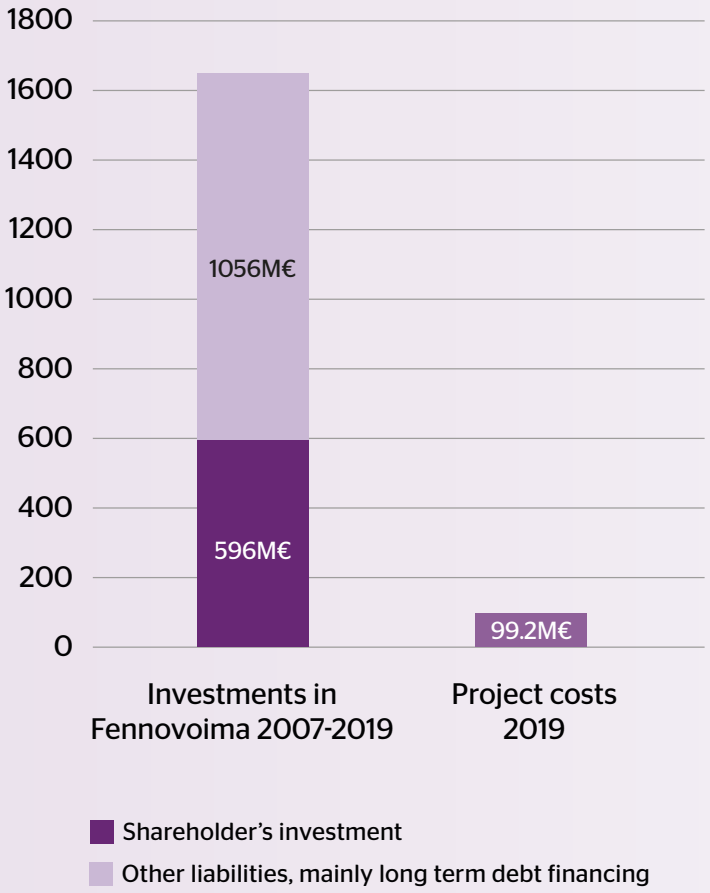
Karolina Wrona
Safety Culture Specialist

Financial status and governance

For us, economic responsibility means producing value for shareholders over the long term and generating a positive impact on the Finnish national economy. We protect our operations from risks and secure our ability to operate in the Finnish society by complying with the laws, regulations and our Code of Conduct in all our activities.

Financial figures 2019

Investments in Fennovoima



Key figures in 2019

Balance sheet total 1 584M€

Equity ratio 32.2%

Liquidity position Good

Average number of personnel 342

Personnel expenses 27.1M€

Payment to the State Nuclear Waste Fund 1.8M€

The company does not have any turnover before the start of electricity generation, which is estimated for late 2028. Until then, the company is estimated to make small losses.

RISK OVERVIEW

Fennovoima's risk management supports the achievement of the set objectives and prevents negative effects on operations. We strive to identify risks as early as possible and to actively take corrective and preventive measures.

By effective risk management we strengthen:

- nuclear safety, quality and security of operations,
- safety and security of personnel,
- economic value creation and minimizing potential economic loss,
- corporate responsibility and
- cooperation and dialogue with stakeholders.

The focus of risk management is on identified risks related to plant performance, progress of the project and efficiency of work. In addition, the local impact of the project and stakeholder relations are a central part of our risk management.

With regard to project management, our risk management focused mainly on risks related to the schedule, quality and technical risks of the project in 2019. In 2020, risks are further studied particularly from the perspective of financial risks.

Causes	Consequences	Project costs	Project delays	Plant performance	Operational costs
Plant	Nuclear & radiological safety			Safety issues	Necessary upgrades
	Design & specifications			Availability issues	Unplanned shutdowns
	Implementation & quality			Lifetime issues	Unplanned maintenance
	Operation & maintenance			Operational issues	Additional resource needs
Deliveries	Engineering & licensing	Additional resources	Delayed deliveries		
	Procurement & supply chain				
	Construction & installations				
	Commissioning & training				
Enablers	Management & leadership		Delayed work		
	Competence & resources		Delayed operation		
	Partners & advisors		Lagging support	Lacking support	
	Platforms & tools	Low productivity	Missing information		
External	Financing		Financing delays		Interest rates
	Authorities		Authority delays		
	Shareholders			Financial pressure	
	Regional aspects		Local challenges		

RESPONSIBLE BUSINESS PRACTICES

Compliance with laws, regulations and our Code of Conduct secures our ability to operate in the Finnish society. All Fennovoima employees carry the responsibility for following the law, protecting human rights and promoting justice. We operate with absolute integrity and honesty.

Compliance management

The identified key risks associated with business ethics for Fennovoima are

- Corruption
- Unjust influence and conflicts of interests
- Risks related to the supply chain
- Risks related to the neglect of legal requirements.

Fennovoima's Compliance & Ethics Program places special emphasis on these risk areas.

The Compliance & Ethics Program has been approved by Fennovoima's Board of Directors, and the CEO carries the responsibility for its implementation. In practice, the Compliance unit is in charge of the development and follow-up of the Program, processing of concerns, and providing instructions and training to the personnel. The Compliance unit also processes suspected violations and non-conformities and implements the necessary actions.

Compliance & Ethics training

Successful operation in the nuclear industry requires that all the personnel are familiar with the applicable laws and regulations and is committed to compliance with them and with the nuclear safety principles, company policy and ethical principles that steer the organization's operations.

In 2019, 93% of our own personnel and 50% of the internal consultants (total: 86%) had completed the compulsory training on our Code of Conduct within the time limit of six months. In 2018 the combined completion percentage was 89 and the set time limit was four months. We are also planning to adopt an online training course for our personnel to support and maintain their understanding of ethical matters.

Company policy

Defines the key principles on quality, nuclear safety, occupational health and safety, human resources, environment, company security and communication.

Fennovoima Code of Conduct

Incorporates the principles that are followed in all our operations.

Instruction on prevention of money laundering and terrorist financing

Instruction on anti-bribery and corruption

Our Company Policy and the Code of Conduct follow the principles of the UN Global Compact responsibility initiative.

Reporting concerns

We encourage our employees to report any suspected violations of laws, our Code of Conduct and internal regulations. These should be reported primarily to the supervisor or to the Compliance team. Fennovoima also has a so-called whistleblowing tool that allows anonymous reporting of all compliance-related observations. The tool is available to all Fennovoima employees.

Absolute confidentiality is applied to all communications related to expressing concerns, and we do not tolerate any countermeasures, harassment or discrimination of persons who have submitted reports. Even an attempt of a countermeasure will lead to disciplinary action and may even lead to the termination of employment.

In 2019, some confidential documentation related to safety design of the nuclear power plant was found from our former employee's home. The case is still under pre-trial investigation. As a result of the case, Fennovoima has identified areas for improvement, for which we have taken the necessary measures.

Anti-corruption

Fennovoima has versatile tools to prevent corruption. These include written Code of Conduct, instructions to prevent corruption and money laundering, which are always available to personnel online, compulsory training on prevention of corruption (as part of the Compliance & Ethics training for employees and internal consultants) and procedures for the processing of suspected and observed incidences. Any offer, promise, grant or gift must comply with applicable laws and Fennovoima's instructions.

In 2019, no corruption cases came to our attention. However, there was one case in which the conflict of interest had not been understood before the procurement process began. We will further illustrate conflict of interest situations in our Compliance & Ethics training to ensure that the rules are clear to everyone and to avoid ambiguity. Companies included in the supply chain have committed to complying with Fennovoima's Code of Conduct or similar principles. Fennovoima has established contractual obligations for supply chain companies to prevent corruption in their own operations and in their supply chains.

SIGNIFICANT NON-COMPLIANCES WITH LAWS AND LEGAL REQUIREMENTS	2019	2018	2017
Fines or non-monetary sanctions for non-compliances	0	0	0

CORRUPTION	2019	2018	2017
Confirmed incidents of corruption	0	0	0

Reporting principles

This Fennovoima report contains information on the progress of the Hanhikivi 1 project and on the focus areas of corporate responsibility. The report covers the year 2019. The information on the progress of the project is based on our internal evaluations and the views of Fennovoima's experts. For sustainability reporting purposes, we apply disclosures of GRI Standards and Fennovoima's own disclosures that we have defined as essential to our corporate responsibility.

When defining what matters to us in terms of corporate responsibility, we have taken into account the expectations and requirements of both our own organization and external stakeholders, in accordance with the materiality matrix shown on the next page. More information on the definition of materiality and our sustainability targets can be found at: www.fennovoima.fi/en/responsibility

DATA BOUNDARIES AND INFORMATION SOURCES

The data presented in this report covers Fennovoima Oy's functions in Helsinki and Pyhäjoki and in the Hanhikivi 1 nuclear power plant project site, if not otherwise stated. Fennovoima's subsidiary Fennovoima RUS is not included in the scope of the report as it has only one employee. To cover the material aspects of the Hanhikivi 1 project site operations, the matters that relate directly to the material aspects of Fennovoima's corporate responsibility, also regarding the plant supplier RAOS Project and main contractor Titan-2, are included in this report.

The financial data presented in the document is from Fennovoima's audited financial statement. Supply chain data includes information from the Fennovoima Management System (FMS) and the Hanhikivi 1 site register. EPC (engineering, procurement and construction) scope related supply chain data is supplied by RAOS Project Oy. The environmental data provided in this report covers the Hanhikivi 1 project site. The information is collected from the management system, monthly reports and from independent experts' studies conducted in the plant site area. The construction waste data is from Fennovoima's own systems and from Fennovoima's waste management partner Remeo Oy. Human resources related data in this report covers Fennovoima's organization in Helsinki and Pyhäjoki. Occupational health and safety data describes the Hanhikivi 1 construction site and Fennovoima's offices in Helsinki and Pyhäjoki.

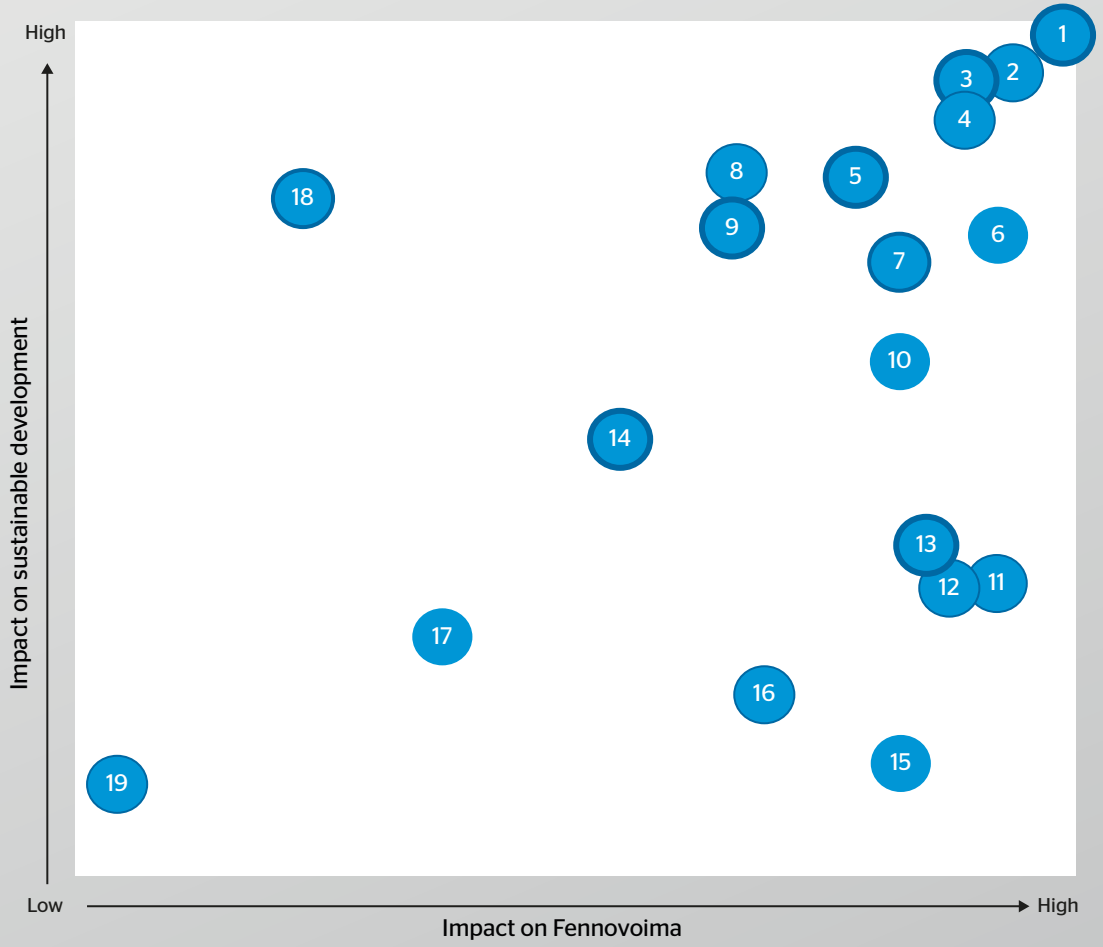
EXTERNAL ASSURANCE

An independent third party, KPMG Oy Ab, has provided limited assurance for the specific indicators on social and environmental performance that are presented in the following chapters of the Finnish language report Occupational safety (p.23), Environment (p.26) People and competence (p.44) and Responsible business practices (p.52). The performance indicators included in the assurance scope are indicated in the sustainability indicator index and KPMG's assurance report. The assurance report and the indicator index are available at: www.fennovoima.fi/en/reports-and-assurance

GLOBAL COMPACT COMMUNICATION ON PROGRESS

Fennovoima supports the ten principles of the United Nations' Global Compact sustainability initiative. We respect and promote these principles throughout our operations, and report on our progress in this report.

Material topics of corporate responsibility



SAFETY
1 Nuclear and radiation safety, emergency preparedness
4 Nuclear fuel life cycle and responsible nuclear waste management
15 Data privacy and security
18 Energy security & energy self-sufficiency of Finland

ECONOMIC RESPONSIBILITY
2 Plant availability & economic benefits to the shareholders
5 Supply chain management
8 Impact on local economy and employment
18 Energy security & energy self-sufficiency of Finland

SOCIAL RESPONSIBILITY
5 Supply chain management: labor practices, supply chain transparency, respecting human rights in the value chain
6 Acceptability of nuclear power
10 Occupational health and safety
11 Competence development and retention
12 Employee engagement and satisfaction
14 Engaging with local stakeholders
16 Personnel and workplace wellbeing
17 Co-operation with educational institutions
19 Supporting good causes, volunteering

ENVIRONMENTAL RESPONSIBILTY
3 Climate change mitigation & reducing fossil dependency
9 Environmental impact management

RESPONSIBLE BUSINESS PRACTICES
7 Business ethics
13 Openness and transparency

The topics in the upper right corner of the matrix are considered most relevant to our corporate responsibility, but all the topics presented are important. Topics that are important to external stakeholders are encircled. The weight of the line indicates the importance of the topic to our external stakeholders.

FENNOVOIMA

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